

# SlimPulse - Gamma Ray

2 in. / 100 ft and 5 in. / 100 ft Measured Depth

## Recorded Mode, Composite Log



Company: Noble Energy INC

Well: NCLP AA06-64-1AHNA

Field: Wattenberg #90750

County: Weld #123

State: Colorado

Country: USA

Section: 4 APIN: 05-123-39027

Township: 6N Rig Name: H&P 277

Range: 63W Rig Type: Top Drive

FL: NAD83 Colorado State Plane, Northern Zone, US Feet

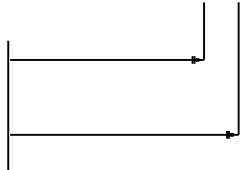
FL1: Latitude: N 40° 30' 52.42", Northing: 1432020.385 ftUS

FL2: Longitude: W 104° 27' 3.10", Easting: 3291695.777 ftUS

Log Measured From: - Drill Floor: 4735.00 ft

Ground Level: 4711.00 ft

Permanent Datum: - Mean Sea Level



Acquisition Dates: 27-Jul-2014 -- 04-Aug-2014

Other Services:

Log Interval: 840.00 (ft) to 16309.00 (ft)

Directional Drilling

Index Types: Measured Depth

Surveys / Continuous D&I

Index Scales: 1:600 2" / 100' 1:240 5" / 100'

Downhole Temperature

Depth Source: Driller's Depth

Downhole Shocks

Depth Sensor: PASON

Print Type: Final

Spud Date: 27-Jul-2014



## Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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Borehole Size/Casing Record						
Bit						
Bit Size ( in )	13.5	8.75	6.125			
Top Driller ( ft )	24	840	6980			
Bottom Driller ( ft )	840	6980	16309			
Casing						
Size ( in )	9.625	7				
Weight ( lbm/ft )	36	36				
Inner Diameter ( in )	8.921	6.28				
Grade	N/A	N/A				
Top Driller ( ft )	24	24				
Bottom Driller ( ft )	840	6968				

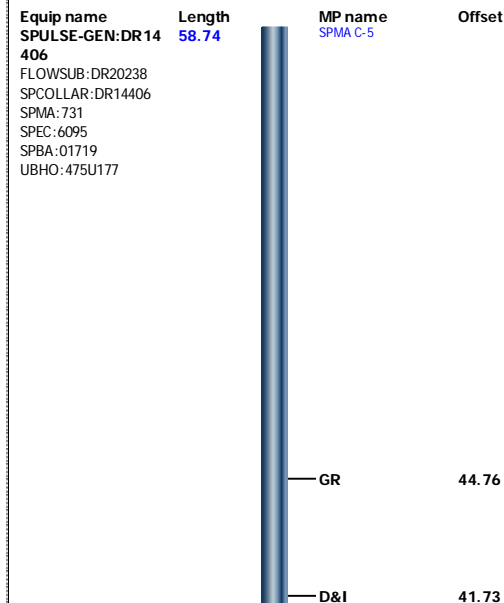
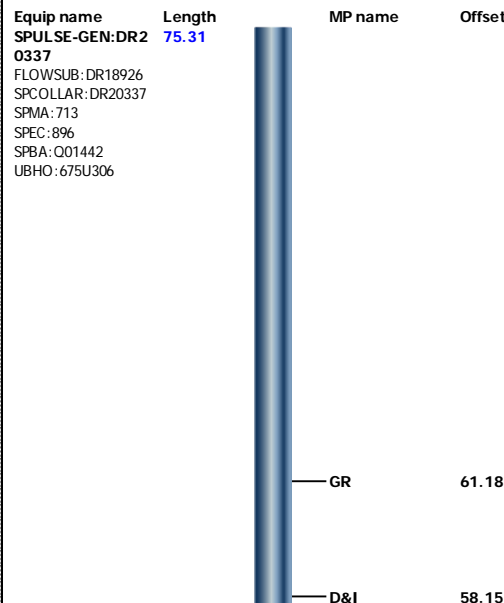
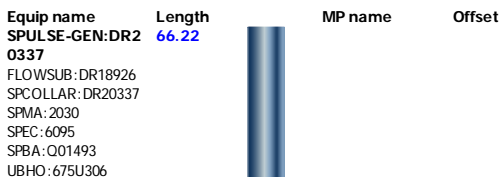
Operational Run Summary						
Parameter ( unit )	RUN001	RUN002	RUN003			
Date Log Started	27-Jul-2014	28-Jul-2014	31-Jul-2014			
Time Log Started	12:43:25	21:10:04	07:20:19			
Date Log Finished	28-Jul-2014	30-Jul-2014	04-Aug-2014			
Time Log Finished	15:58:03	04:30:44	19:03:00			
Bit Size ( in )	8.750	8.750	6.125			
Bit Start Depth ( ft )	840.00	5993.00	6980.00			
Bit Stop Depth ( ft )	5993.00	6980.00	16309.00			
Top Log Interval ( ft )	840.00	5940.00	6918.00			
Bottom Log Interval ( ft )	5940.00	6918.00	16264.00			
Max Hole Deviation ( deg )	10.90	80.85	91.44			
Azimuth of Max Deviation ( deg )	198.34	268.67	268.81			
Logging Unit Number	Command Center	Command Center	Command Center			
Logging Unit Location	Zone 2	Zone 2	Zone 2			
Recorded By	N COOPER	N COOPER	N COOPER			
Witnessed By	Cliff Kester	CLIFF KESTER	CLIFF KESTER			
Service Order Number	14CCO0607	14CCO0607	14CCO0607			

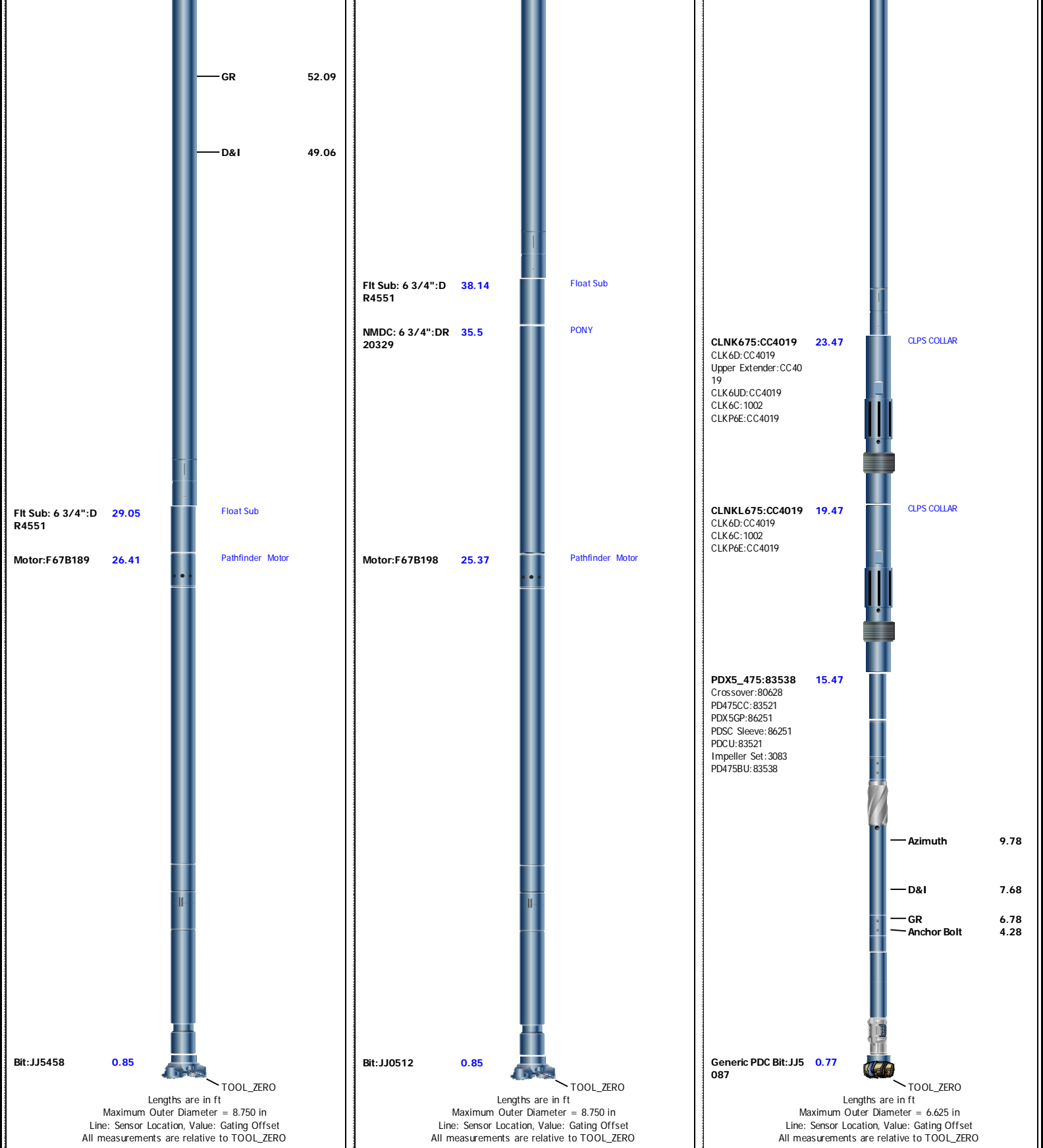
Borehole Fluids						
Parameter( unit )	RUN001	RUN002	RUN003			
Fluid Type	Water	Water	Water			
Max Recorded Temperatures ( degF )	104	116	100			
Source of Sample	Active Tank	Active Tank	Active Tank			
Salinity ( ppm )	34972.17	34972.17	34972.17			

## Remarks and Equipment Summary

Depth Reference: Driller's Depth.

RUN001: Remarks	RUN002: Remarks	RUN003: Remarks
Run Objective: Drill Vertical Section.	Run Objective: Drill Curve Section.	Run Objective: Drill Lateral Section.
Bit to GR: 52.09 ft. Bit to D&I: 49.06 ft.	Bit to GR: 61.18 ft. Bit to D&I: 58.15 ft.	Bit to GR: 44.76 ft. Bit to D&I: 41.73 ft.
Drilled from: 840 ft MD to 5993 ft MD. Logged from: 840 ft MD to 5940 ft MD.	Drilled from: 5993 ft MD to 6980 ft MD. Logged from: 5940 ft MD to 6918 ft MD.	Drilled from: 6980 ft MD to 16309 ft MD. Logged from: 6918 ft MD to 16264 ft MD.
SlimPulse Software: SPEC V11.0 SlimPulse UGR Calibrated: May 23, 2014 SlimPulse UDI Calibrated: May 18, 2014	SlimPulse Software: SPEC V11.0 SlimPulse UGR Calibrated: July 25, 2014 SlimPulse UDI Calibrated: January 11, 2014	SlimPulse Software: SPEC V11.0 SlimPulse UGR Calibrated: May 23, 2014 SlimPulse UDI Calibrated: May 18, 2014
PathFinder A Schlumberger Co. Personnel: MWD: Nicholas Cooper & Dennis Lipcovski. DD: Charles Mitchell & Tony Butler.	PathFinder A Schlumberger Co. Personnel: MWD: Nicholas Cooper & Dennis Lipcovski. DD: Charles Mitchell & Tony Butler.	PathFinder A Schlumberger Co. Personnel: MWD: Nicholas Cooper & Dennis Lipcovski. DD: Charles Mitchell & Tony Butler.
Reason for POOH: Vertical Section TD.	Reason for POOH: Curve Section TD.	Reason for POOH: Well TD.





Well Composite		
Software Version		
Acquisition System		Version
MaxWell		4.0.9163.3000
Application Patch		Patch-SP-10767_22480-4.0.9163.3001
		Patch-NPD_ADN8D_SP3-23661-4.0.9530.3002

Patch-Hotfix_overwrite_survey_for_petrolink-23199-4.0.9530.3002
Patch-Hotfix_MRT_SP3-23306-4.0.9530.3002

Tool Elements	Description	Software Version	Firmware Version
DRILLING_SURFACE	DRILLING_SURFACE	4.0.9469.3000	
SPEC	SlimPulse Electronics Cartridge	4.0.9469.3000	

## Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
RUN001	Drilling	Down	840.17 ft	5993.50 ft	27-Jul-2014 2:49:22 PM	28-Jul-2014 3:58:03 PM	No
RUN001	Ream Down 1	Down	840.08 ft	841.33 ft	27-Jul-2014 2:51:58 PM	27-Jul-2014 2:52:58 PM	No
RUN002	Drilling	Down	5993.67 ft	6980.33 ft	29-Jul-2014 12:53:54 AM	30-Jul-2014 4:30:44 AM	No
RUN002	Ream Down 1	Down	5904.08 ft	5993.58 ft	29-Jul-2014 12:33:35 AM	29-Jul-2014 12:53:54 AM	No
RUN003	Ream Down 1	Down	6969.75 ft	6978.00 ft	31-Jul-2014 1:47:50 PM	31-Jul-2014 2:41:55 PM	No
RUN003	Drilling	Down	6978.00 ft	16311.50 ft	31-Jul-2014 2:41:55 PM	04-Aug-2014 7:03:00 PM	No

All depths are referenced to toolstring zero

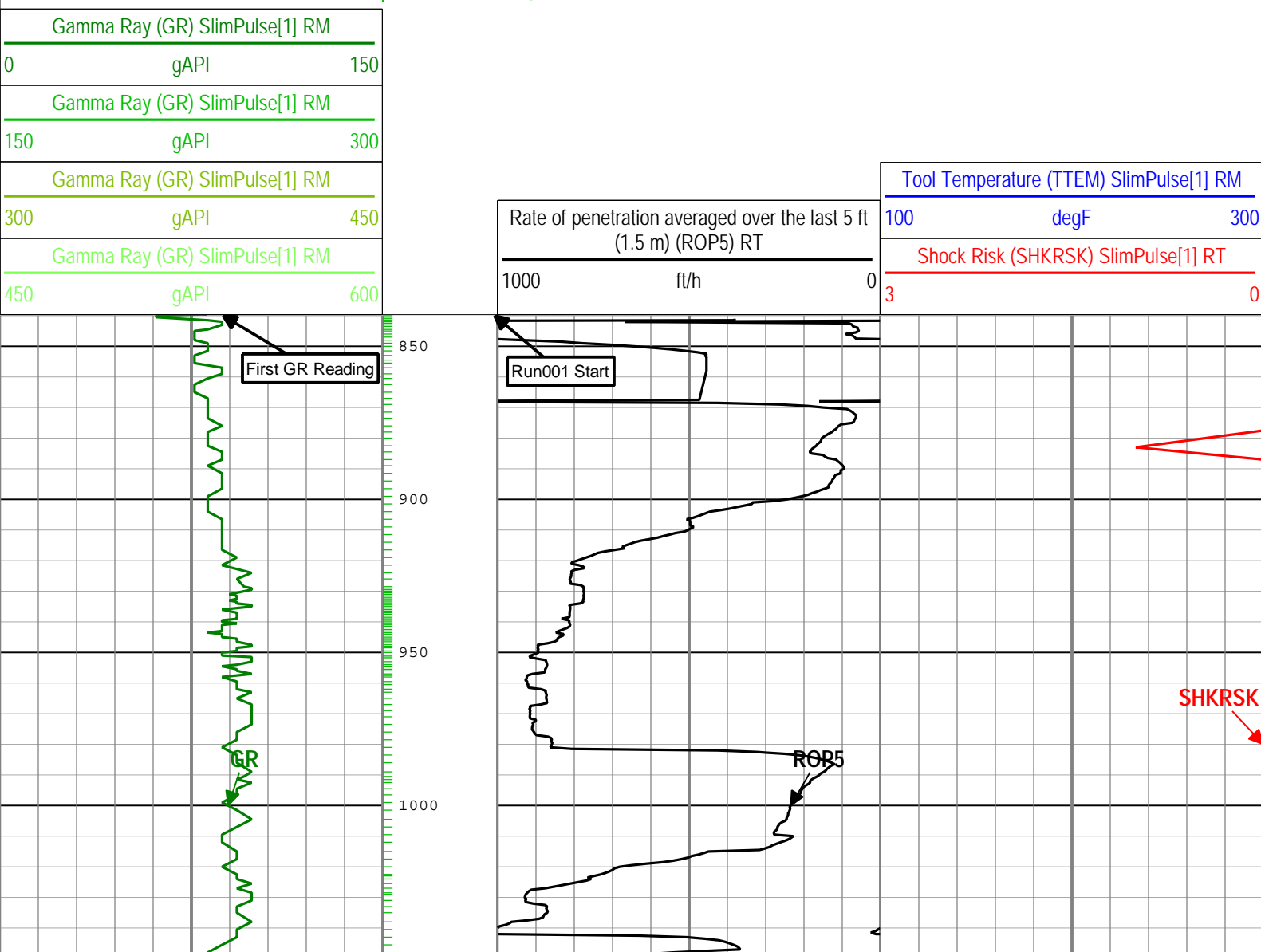
## Log

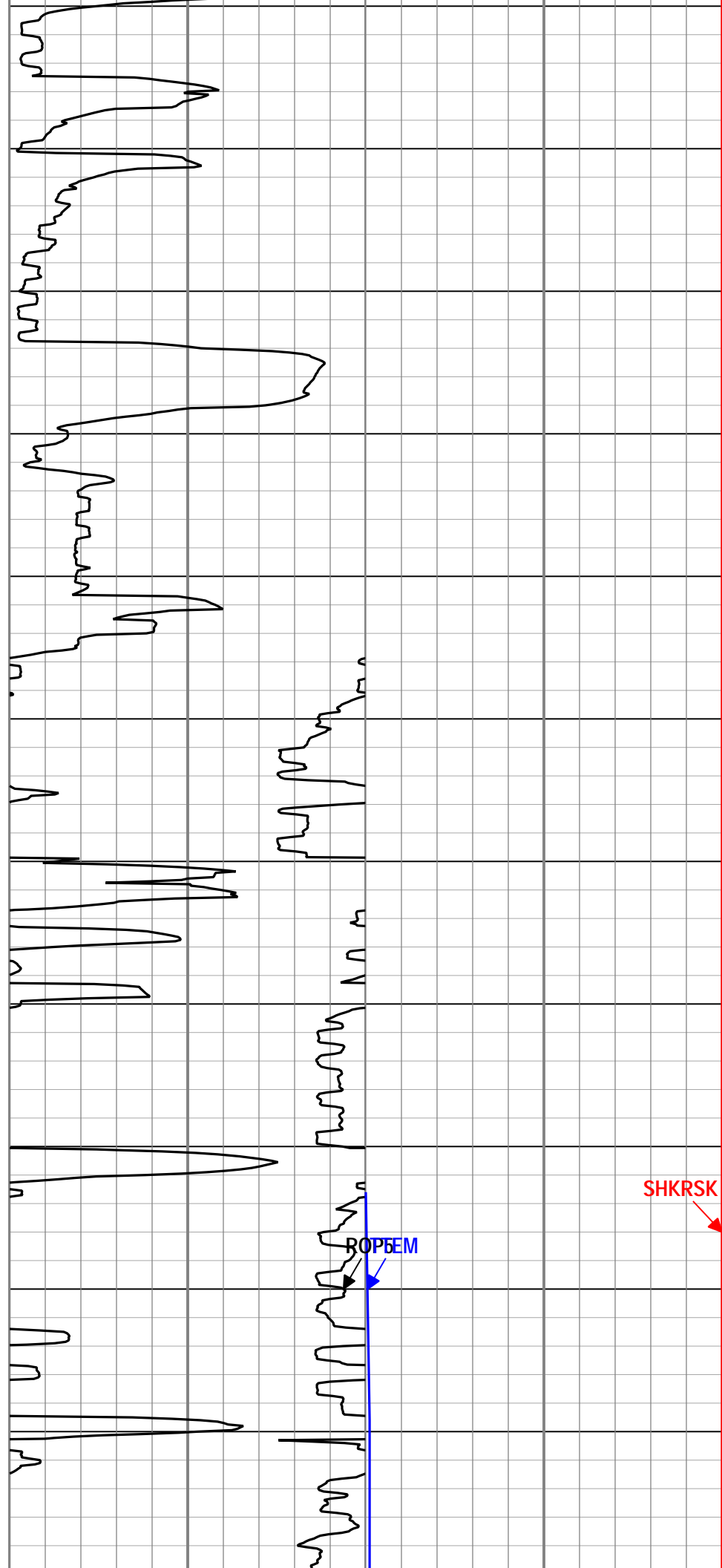
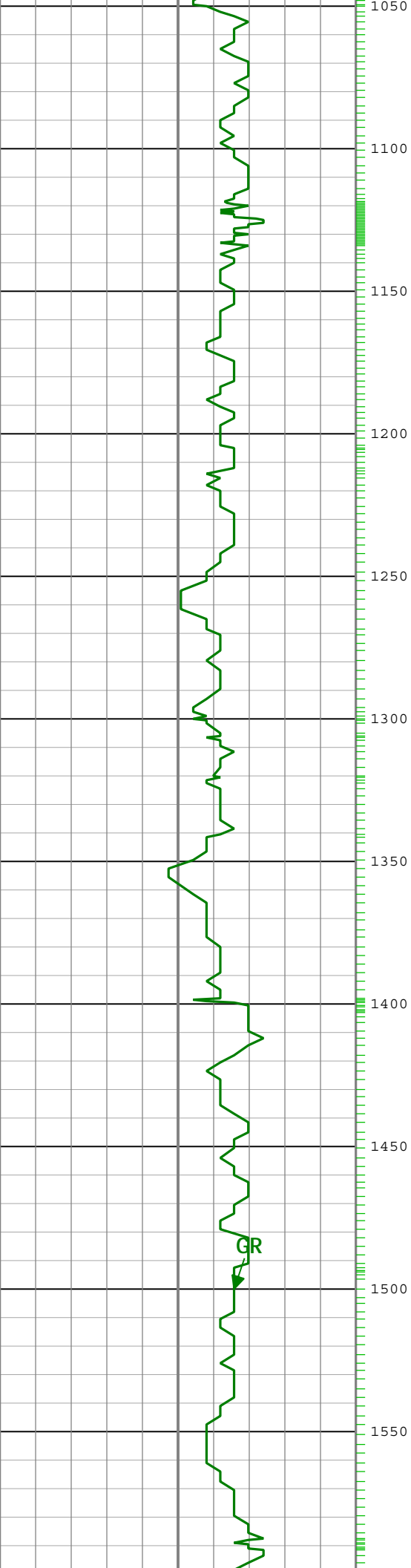
Company:Noble Energy INC      Well:NCLP AA06-64-1AHNA

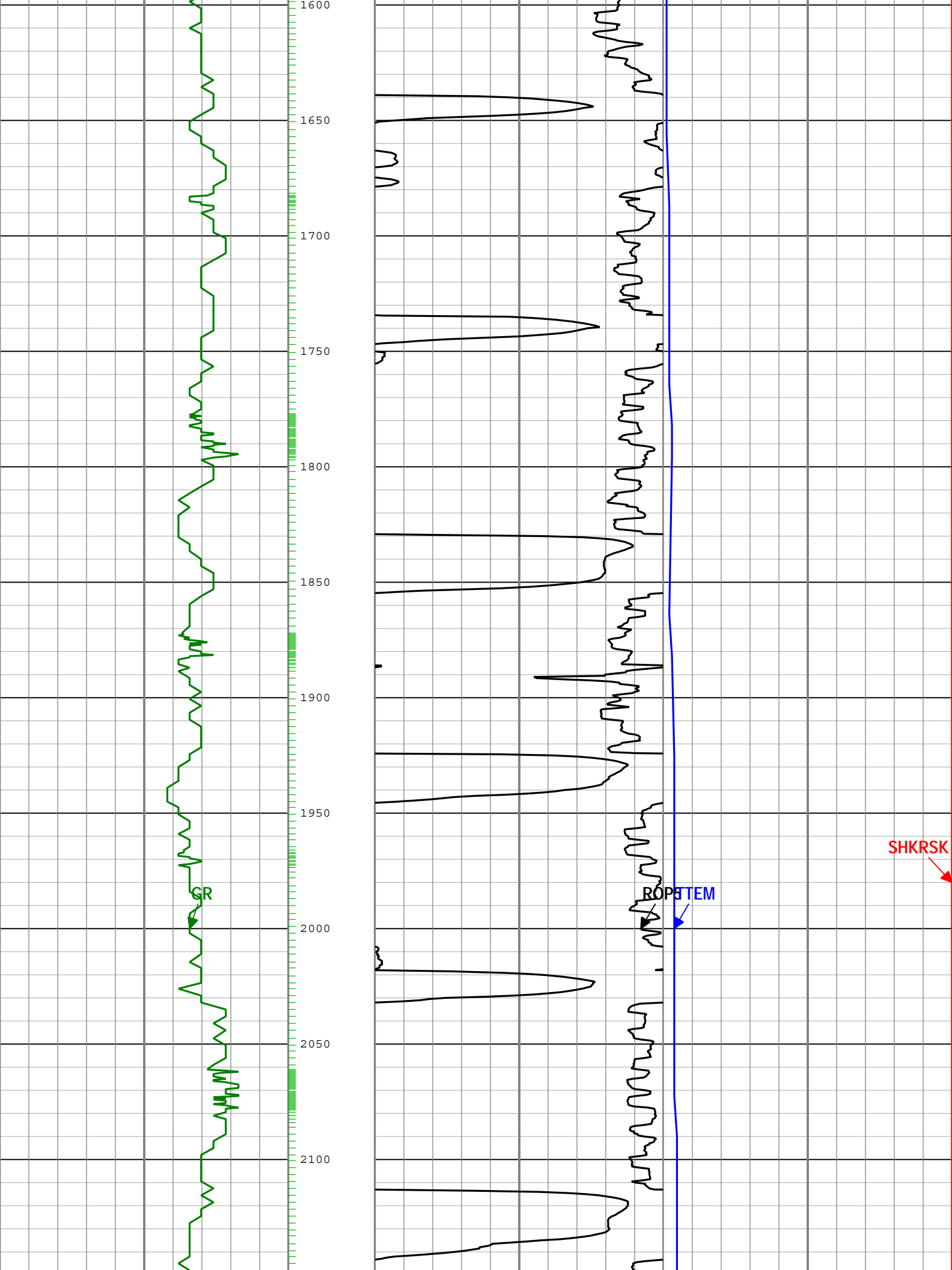
Well Composite:S222

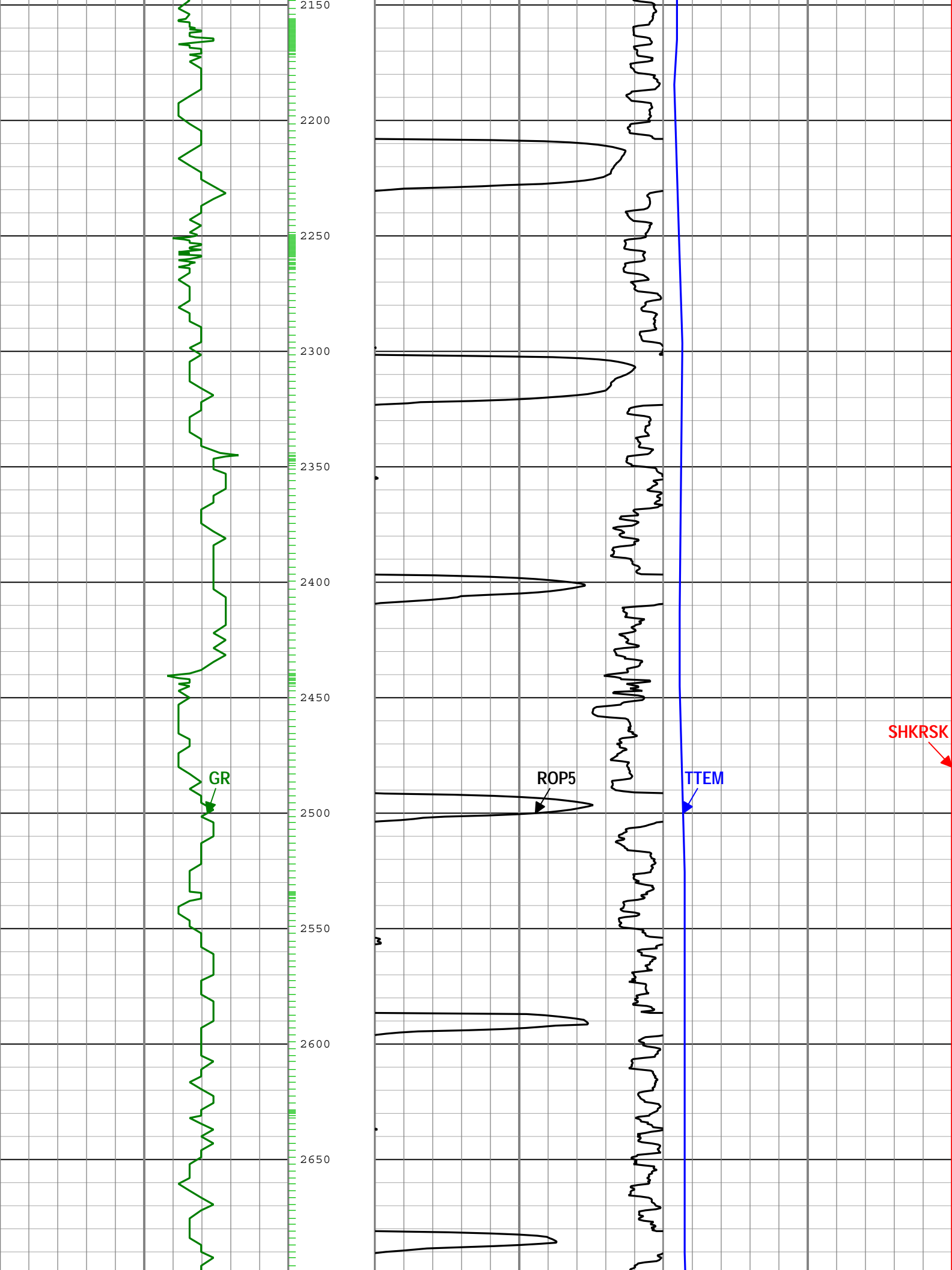
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Date: 05-Aug-2014 03:03:32					

└ GR - Gamma Ray SlimPulse[1] RM

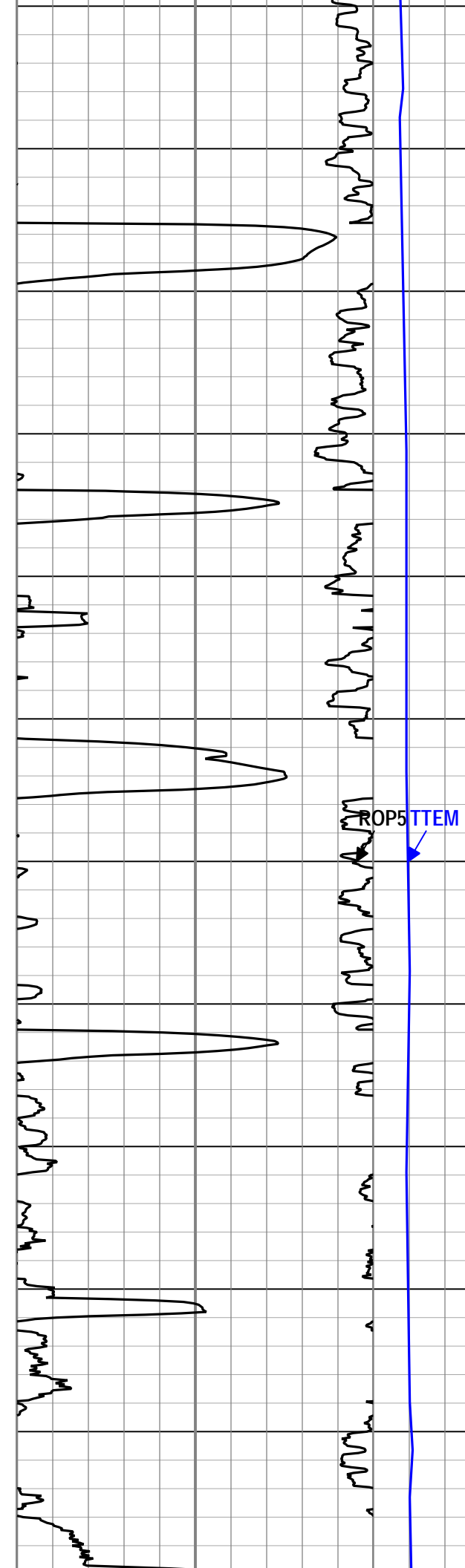
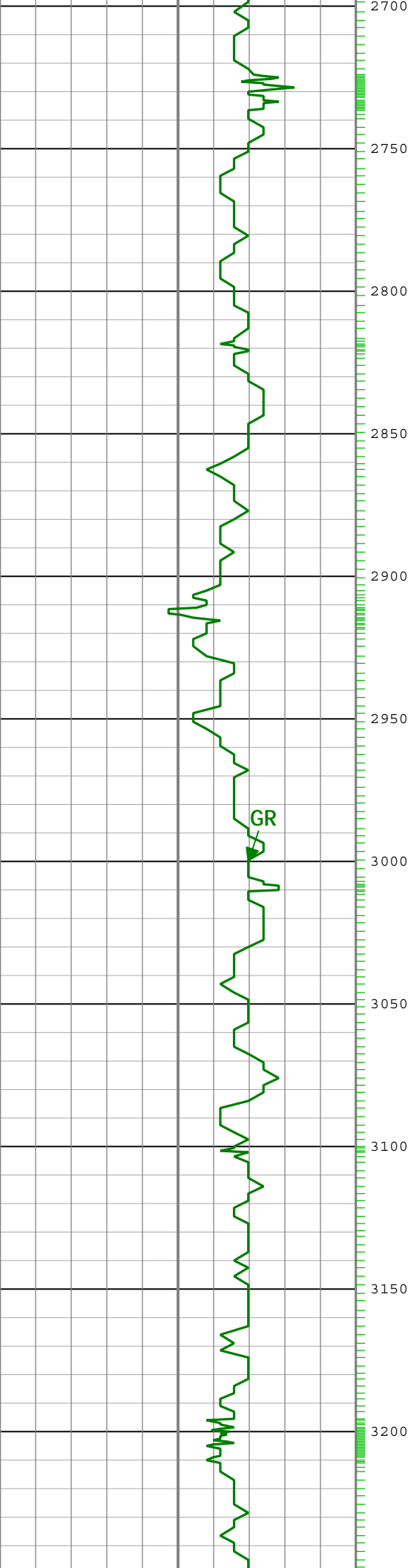


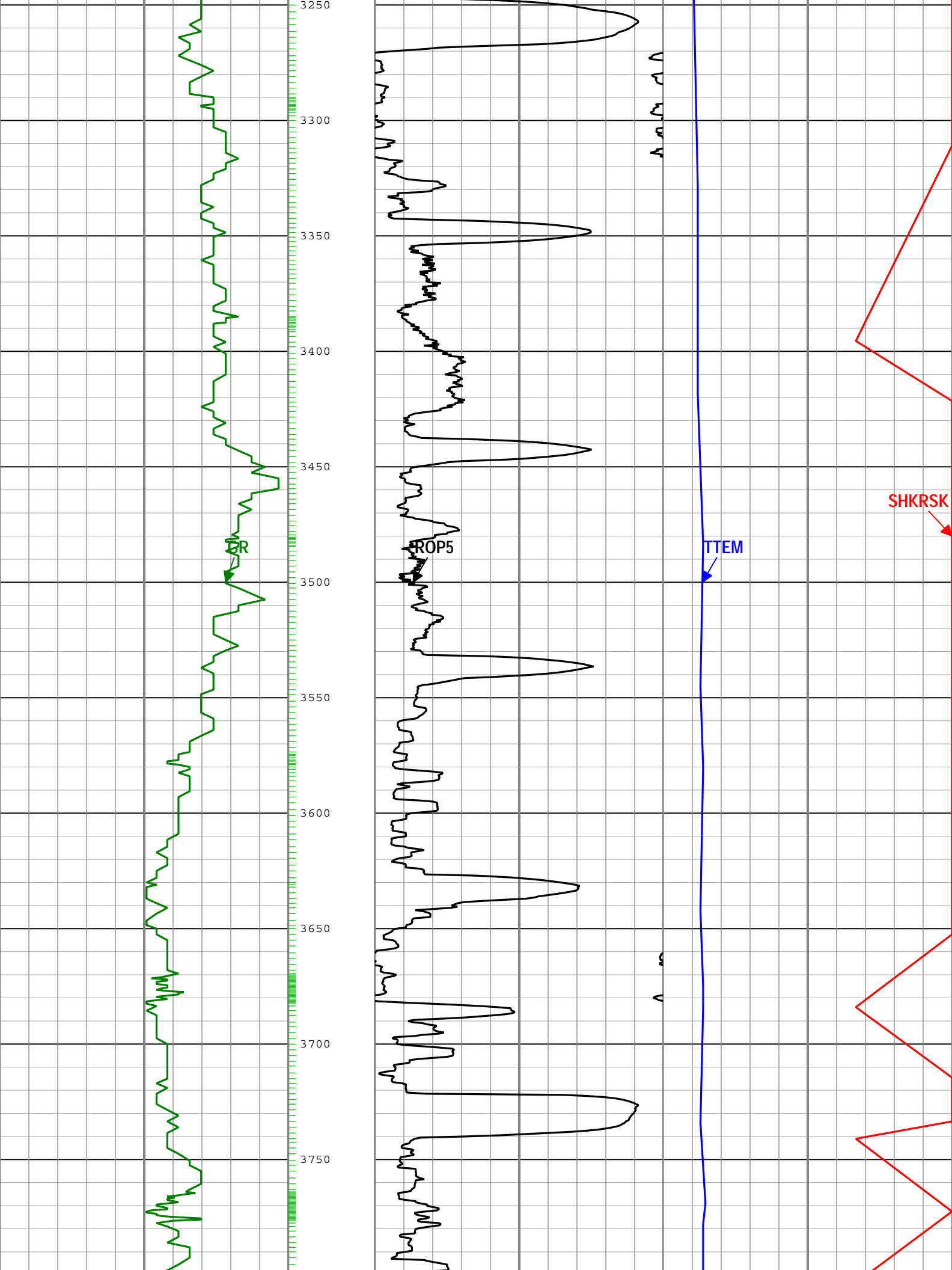


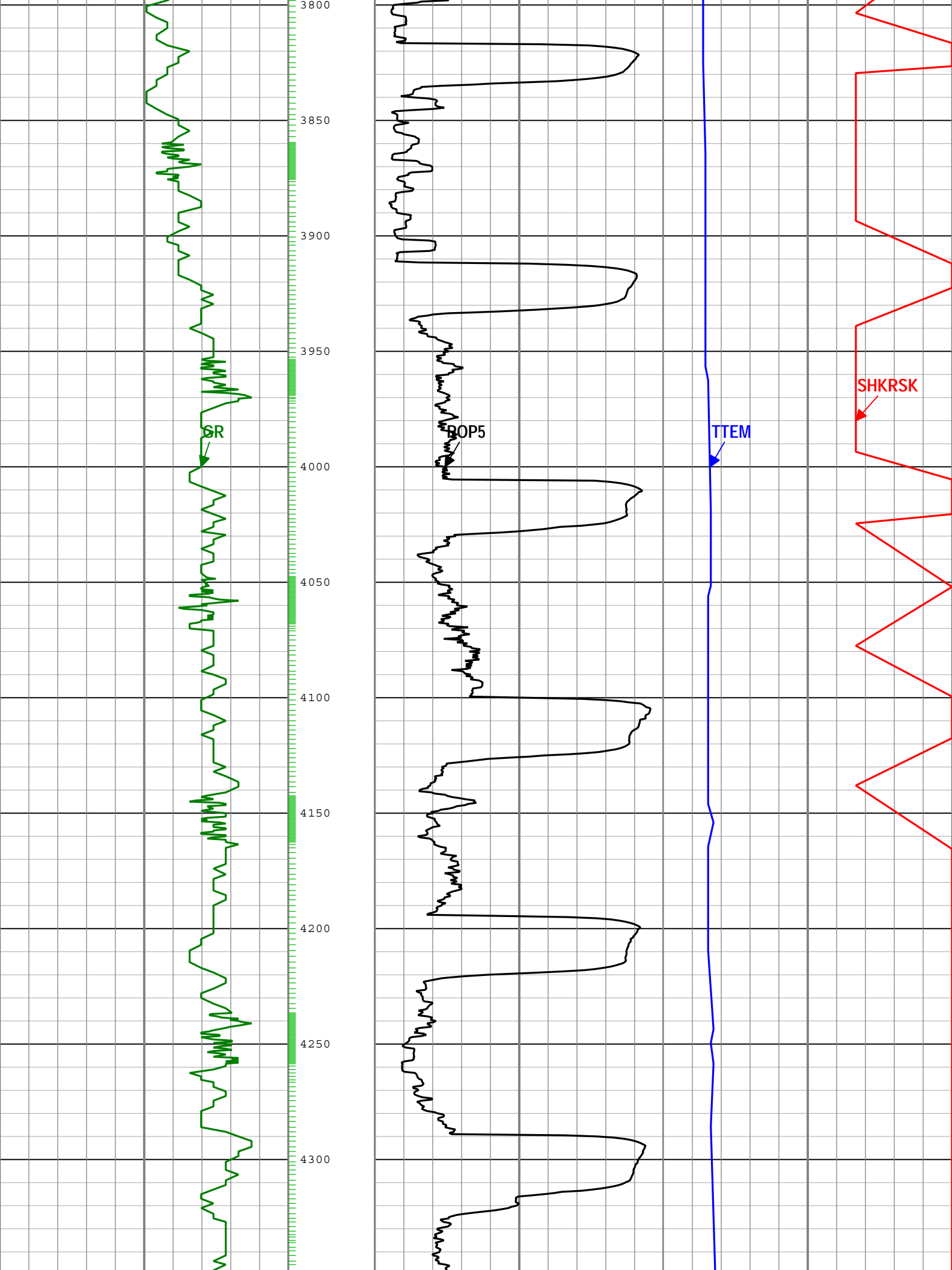


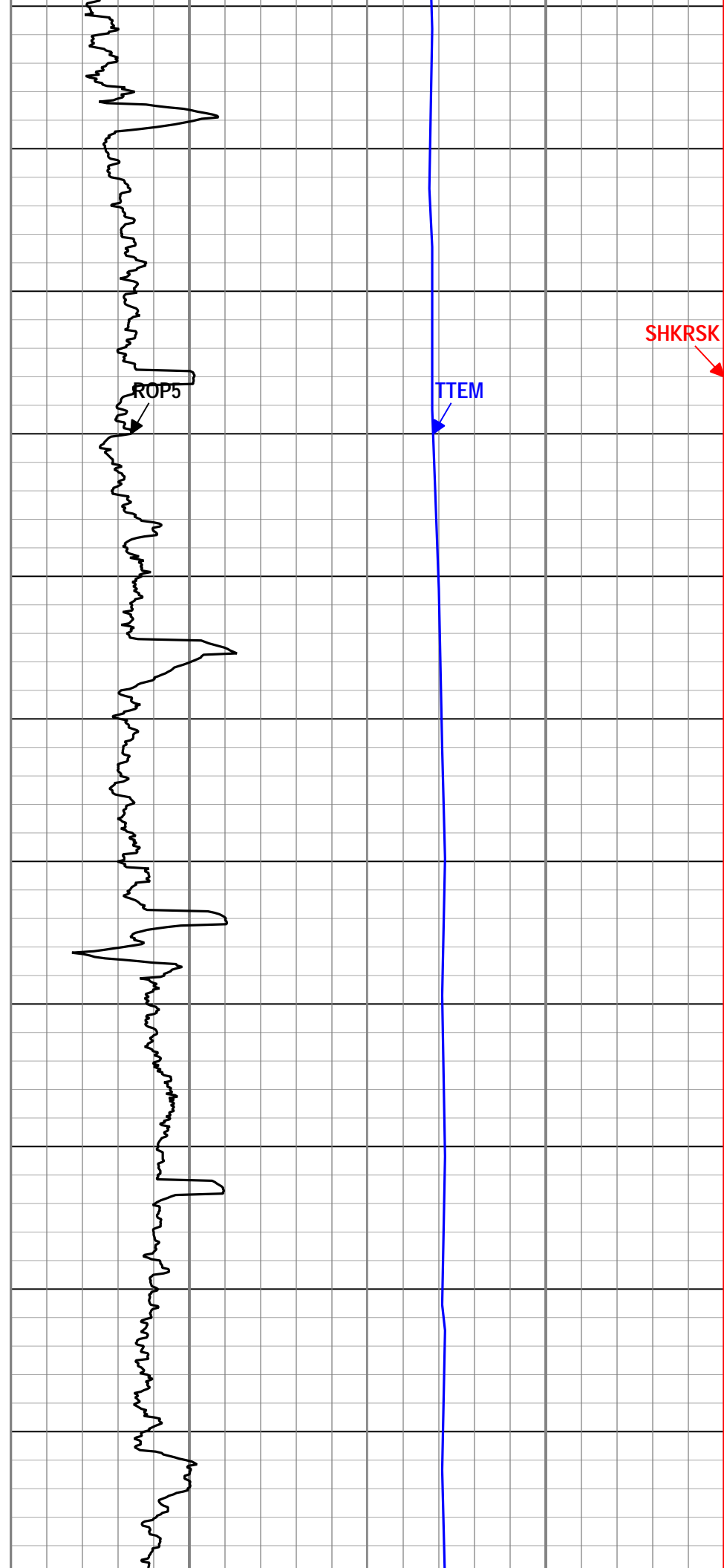
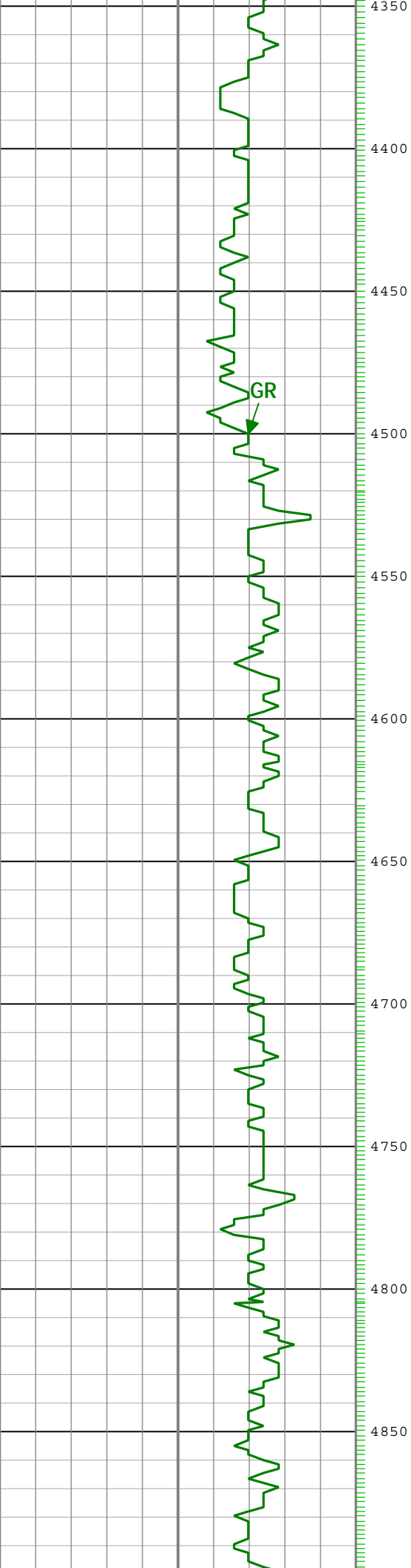


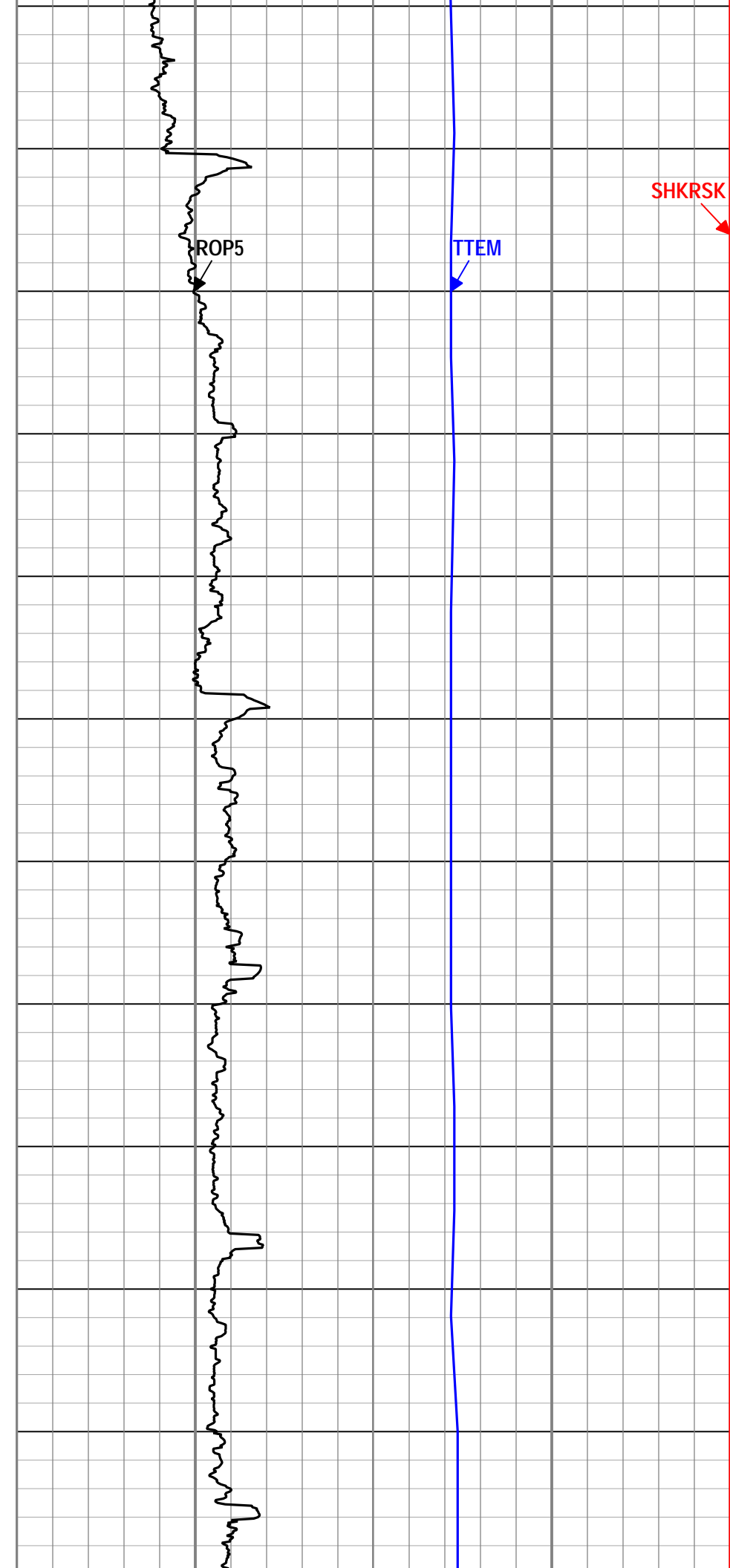
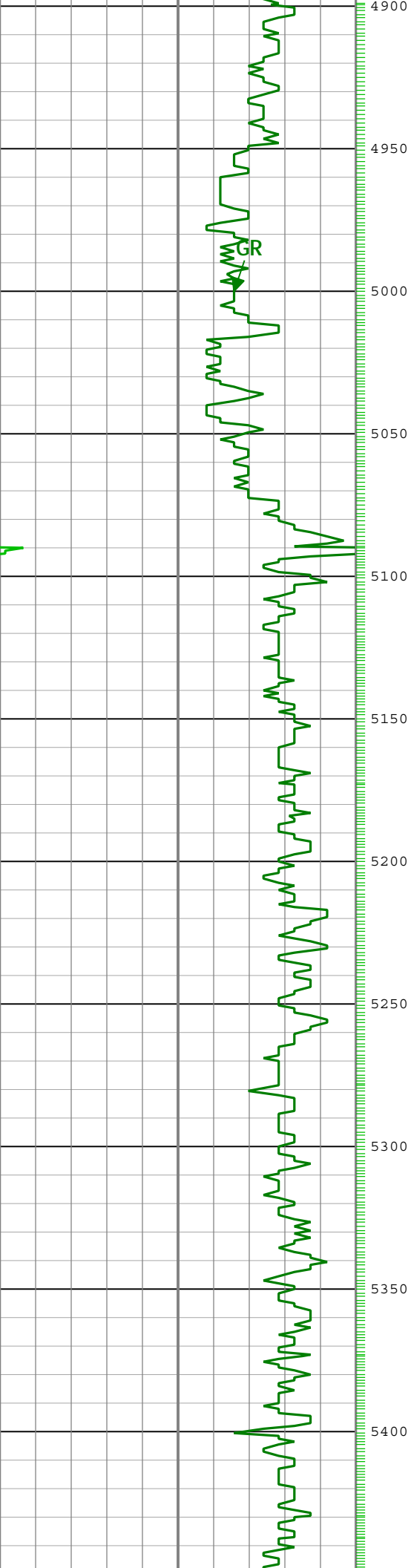


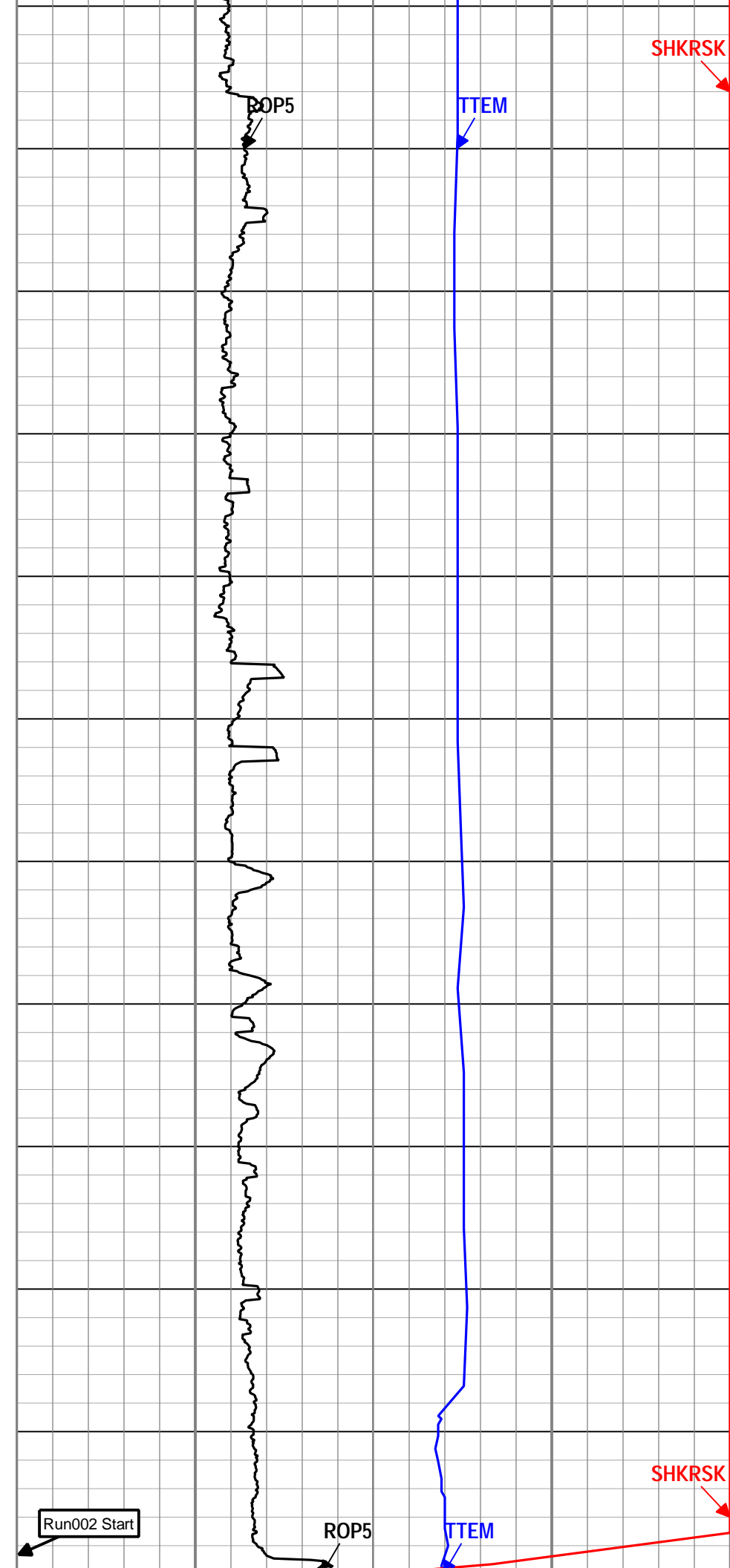
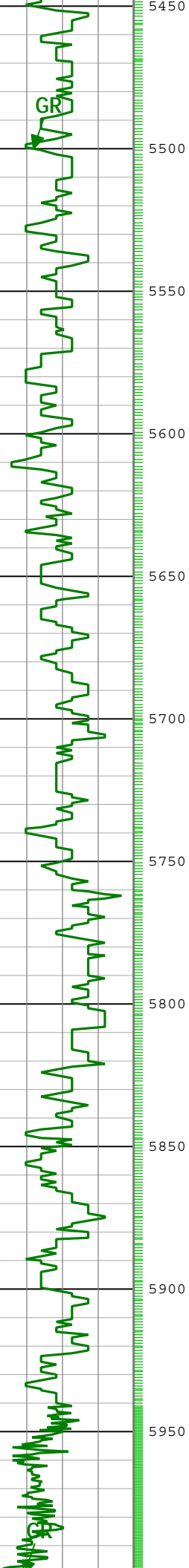


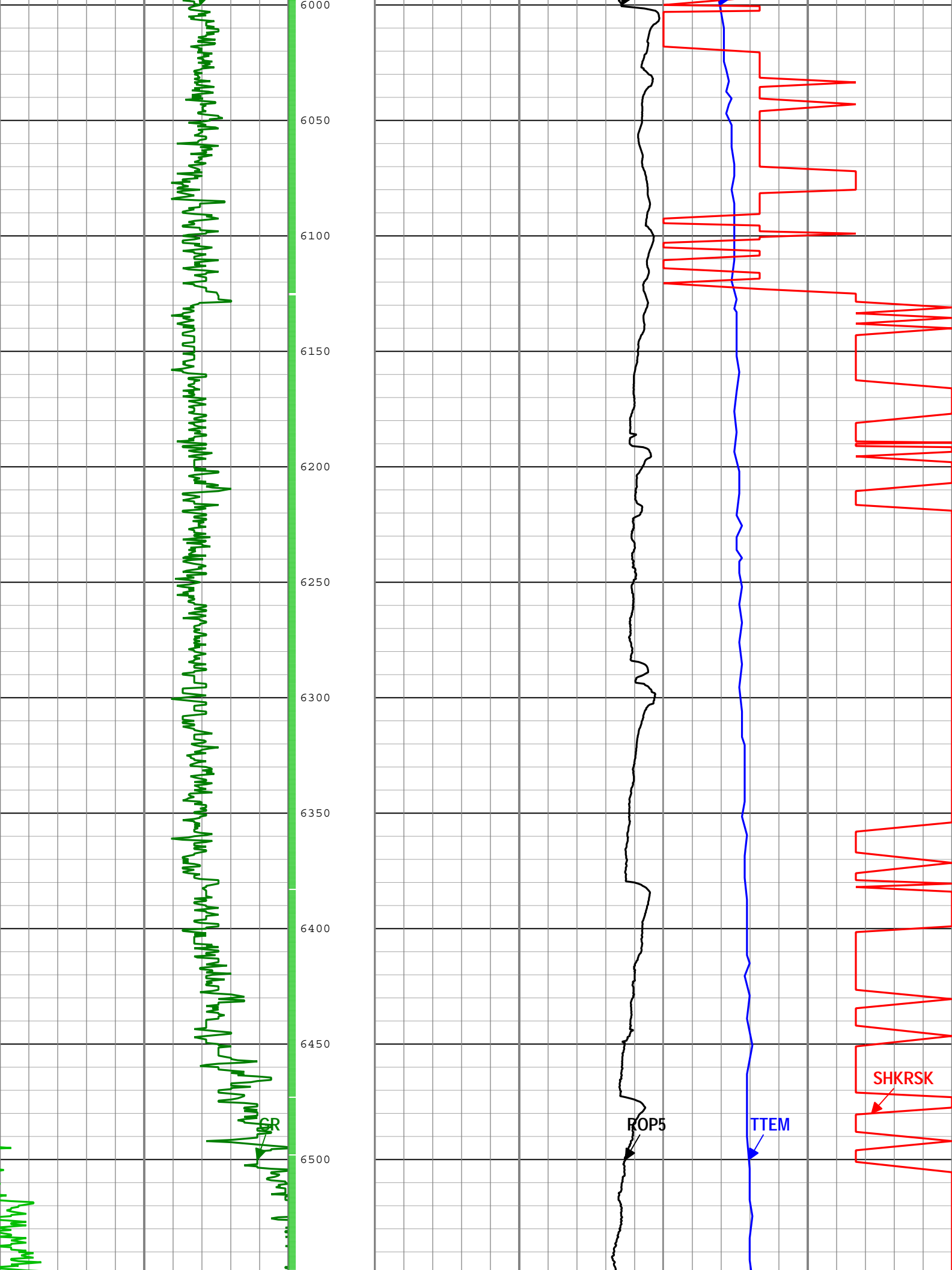


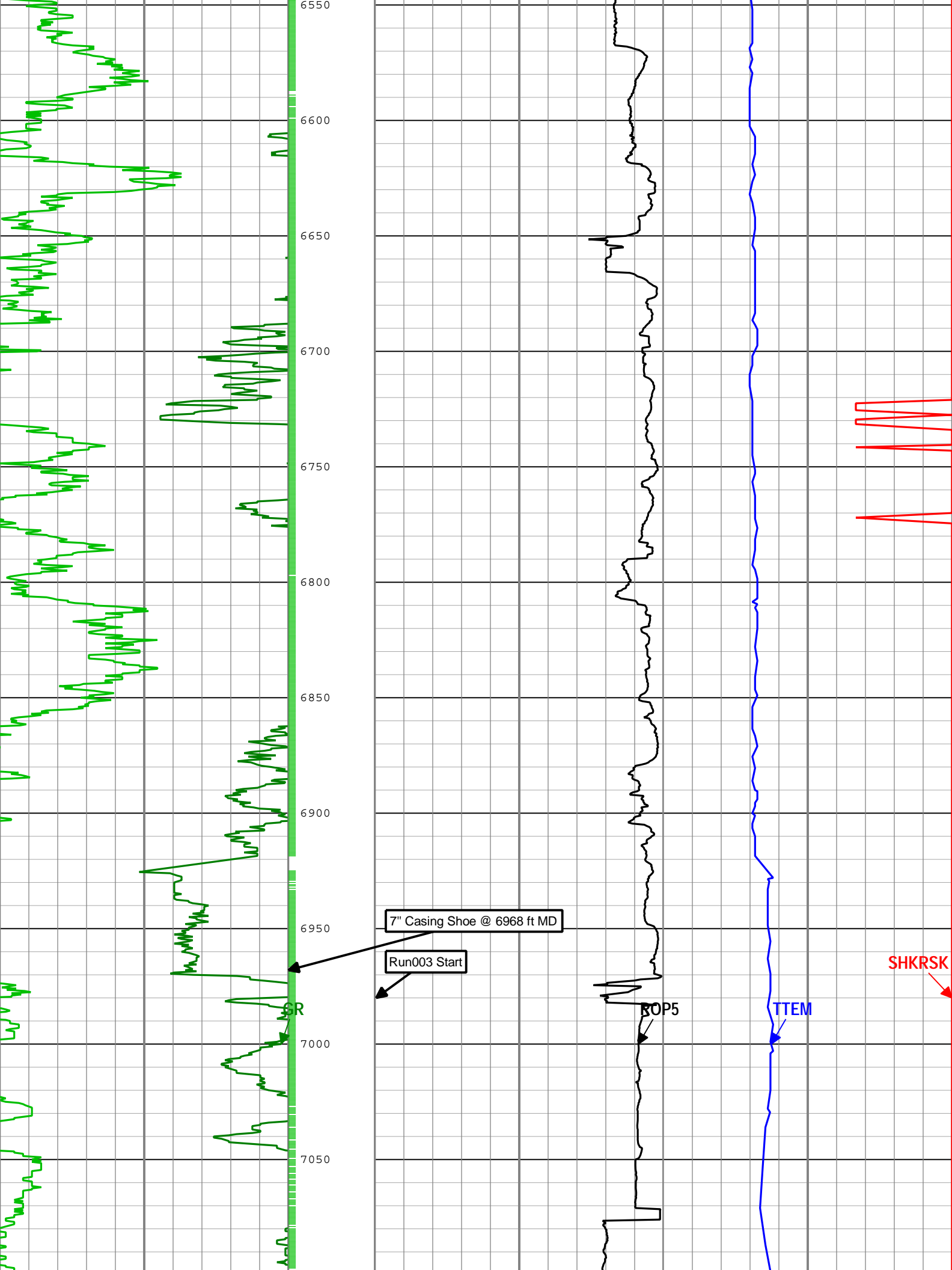




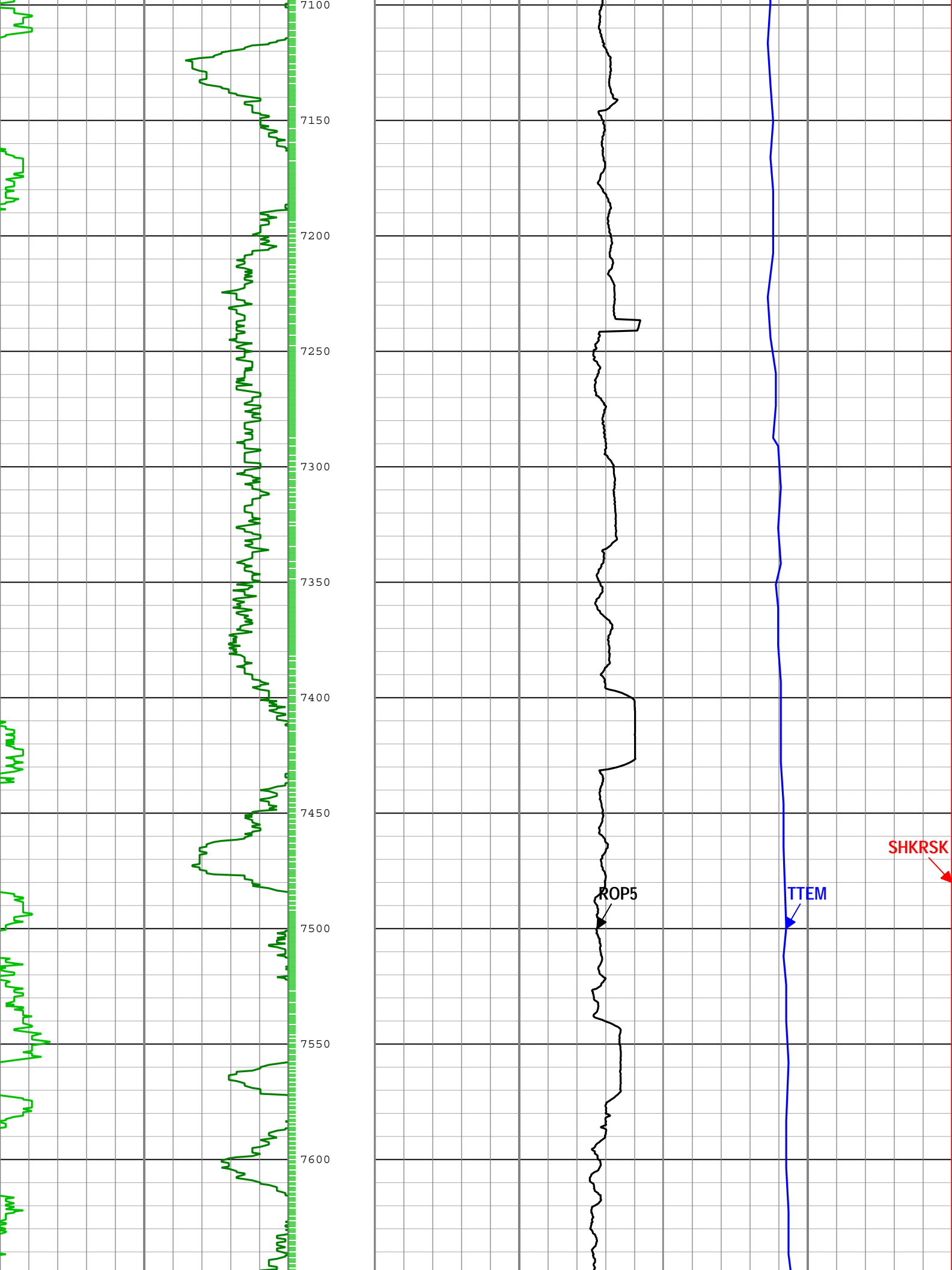


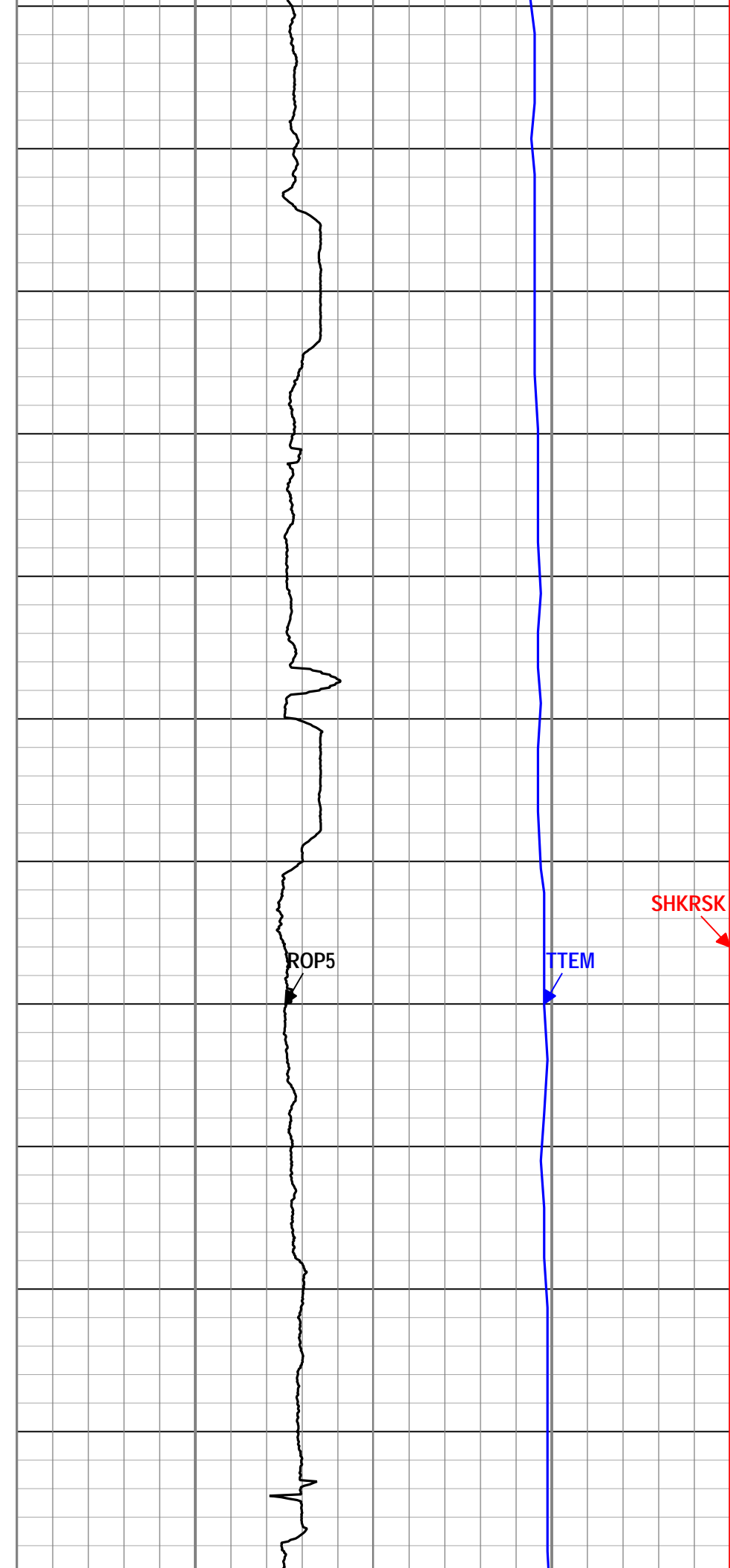
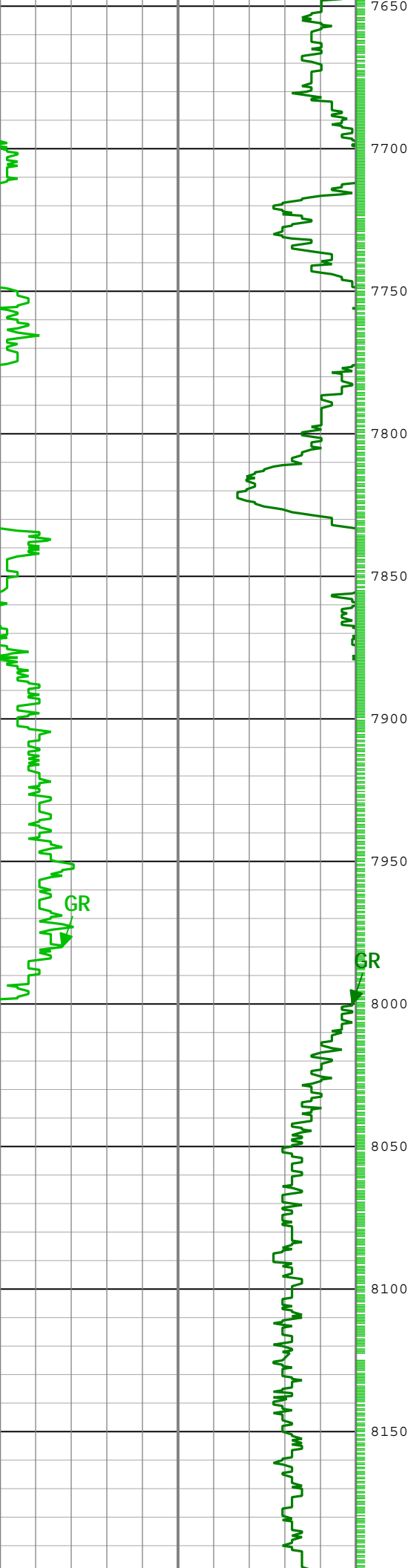


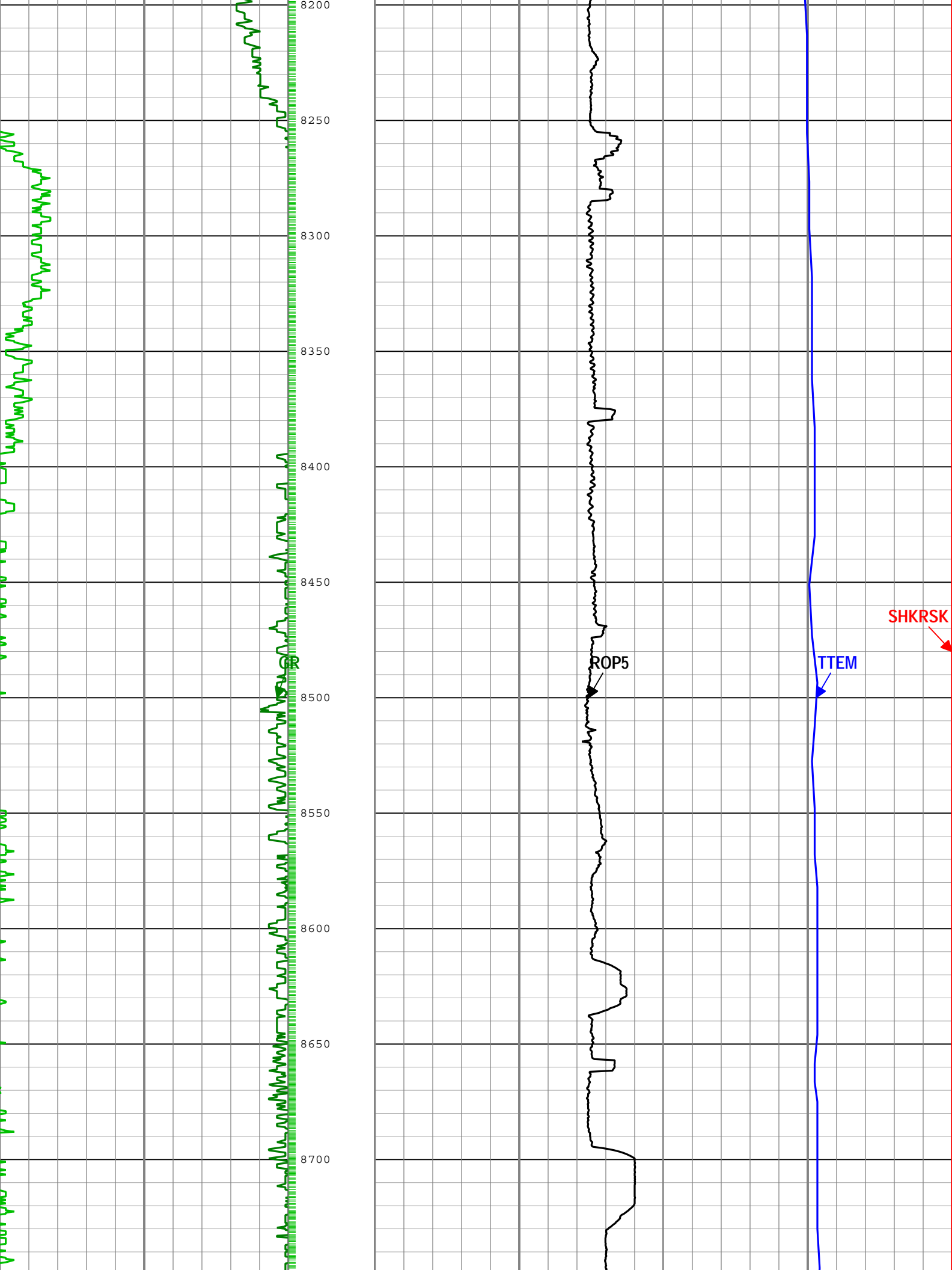


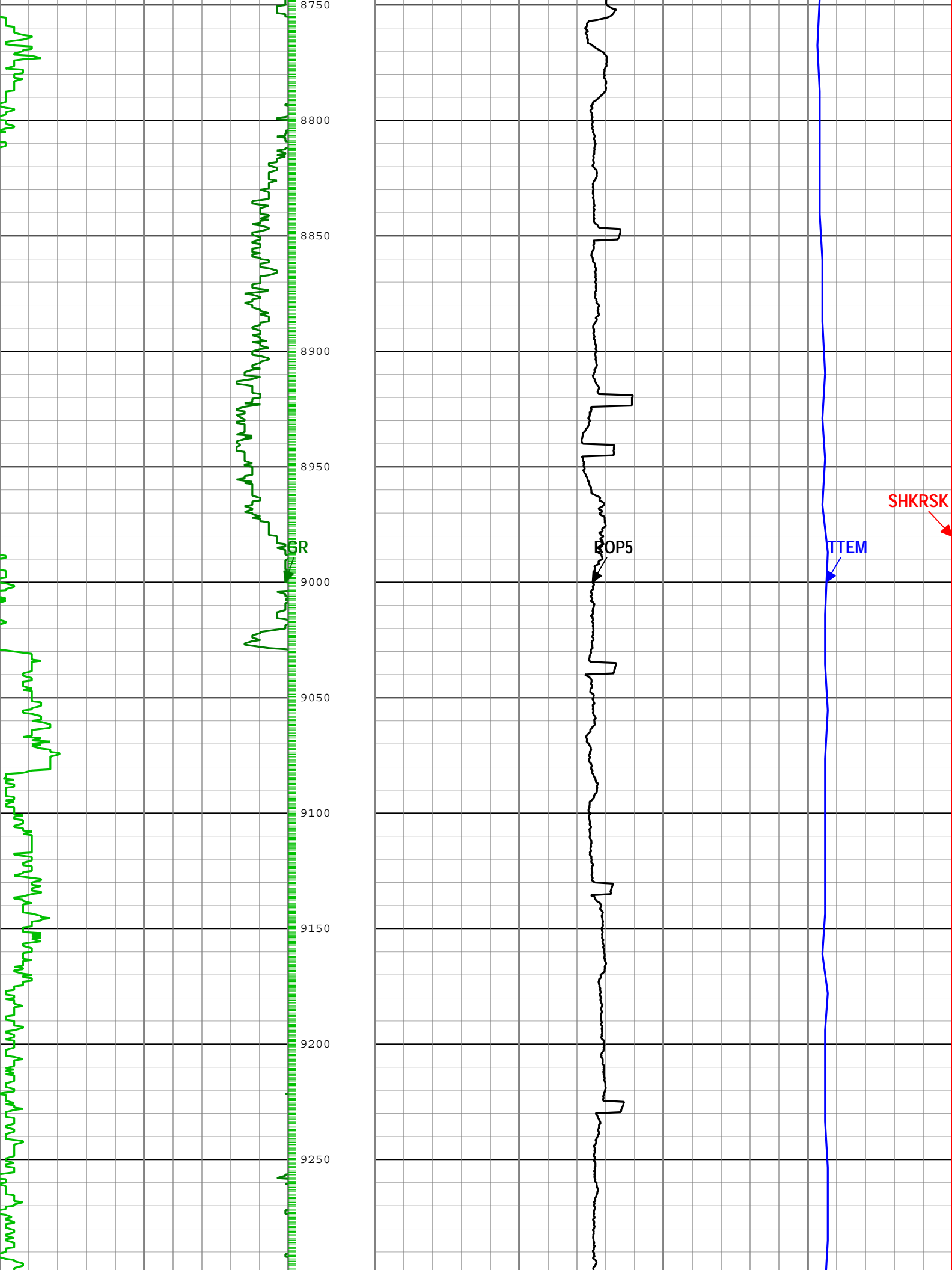


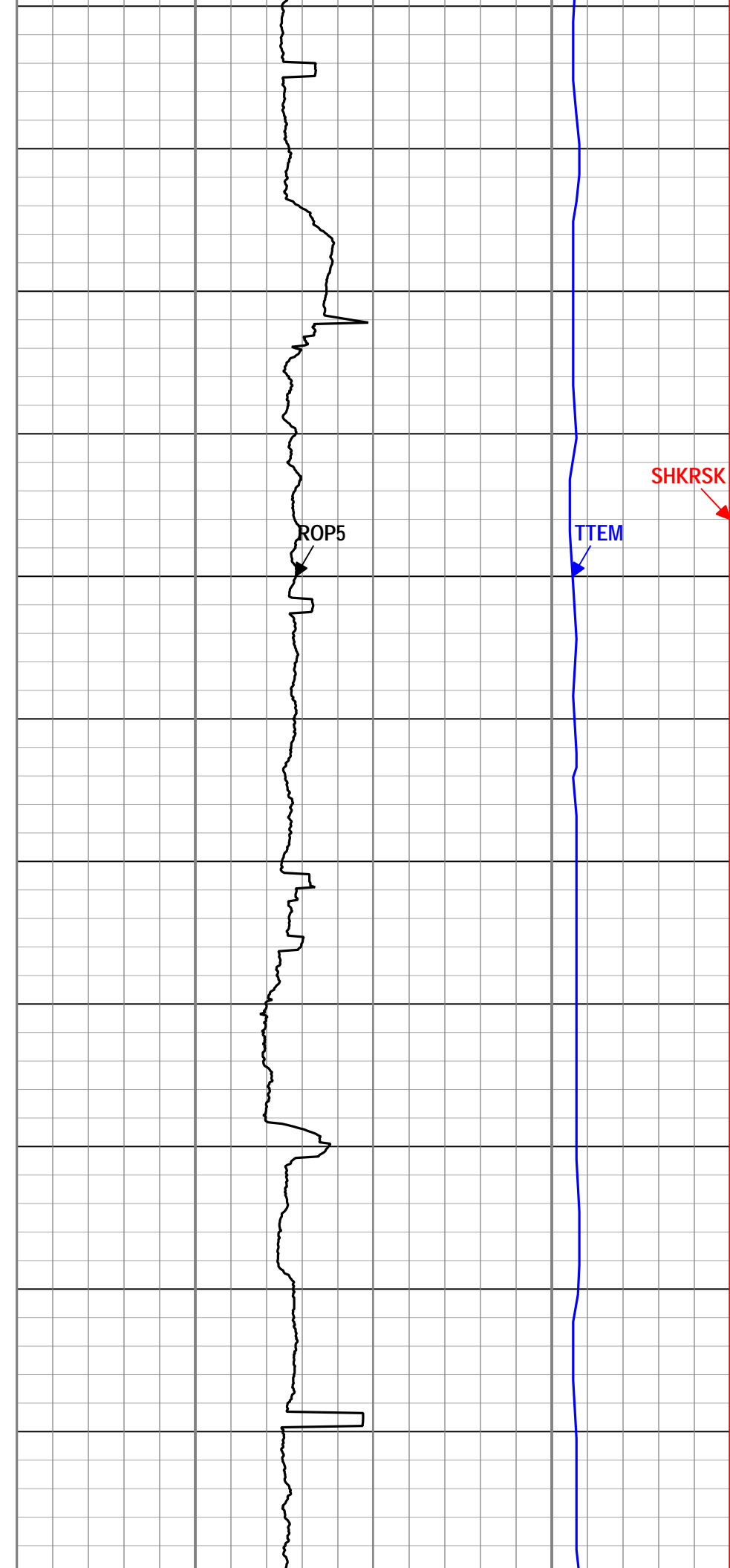
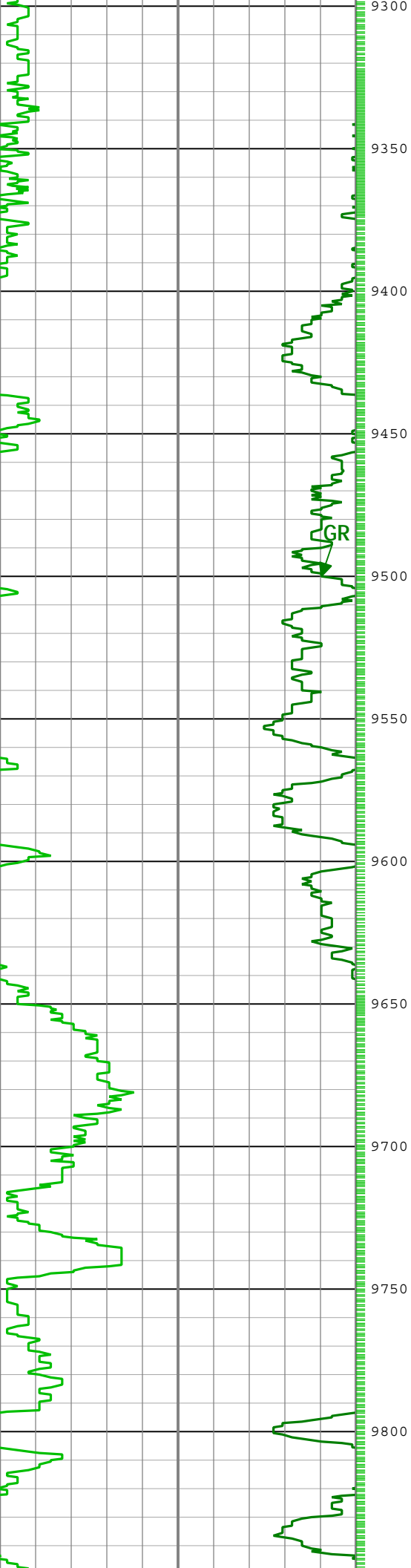


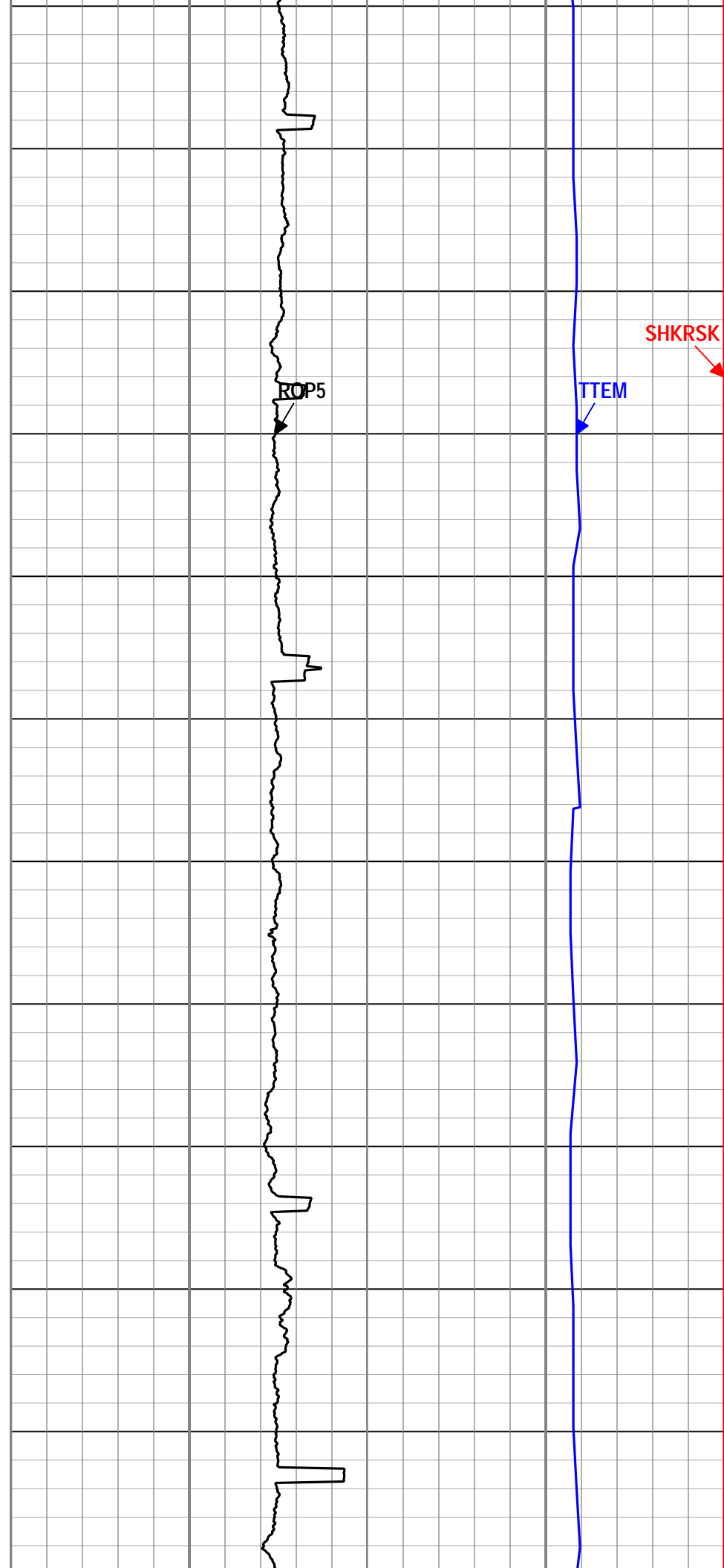
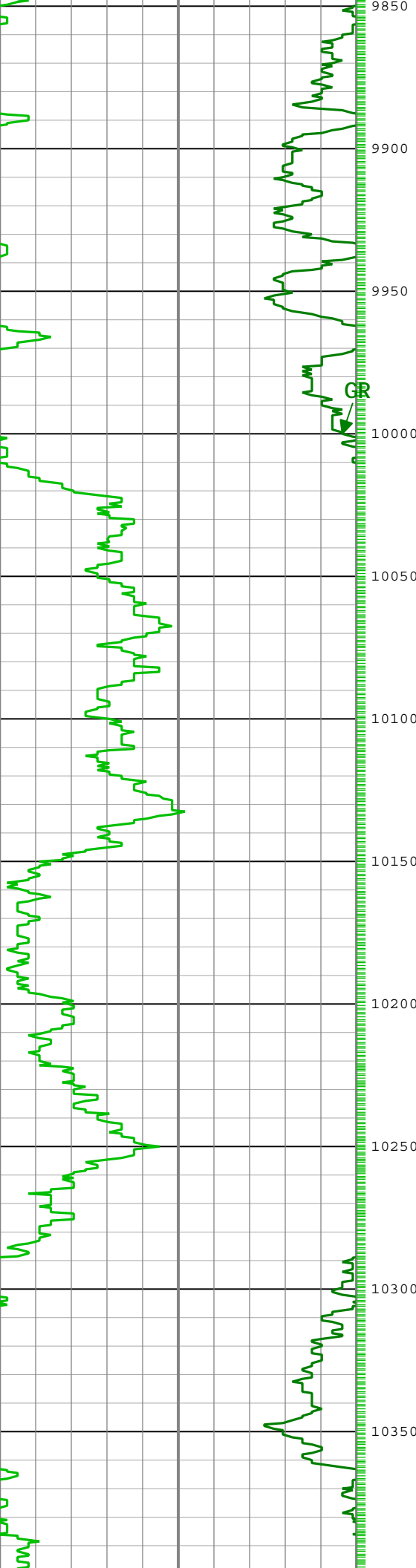


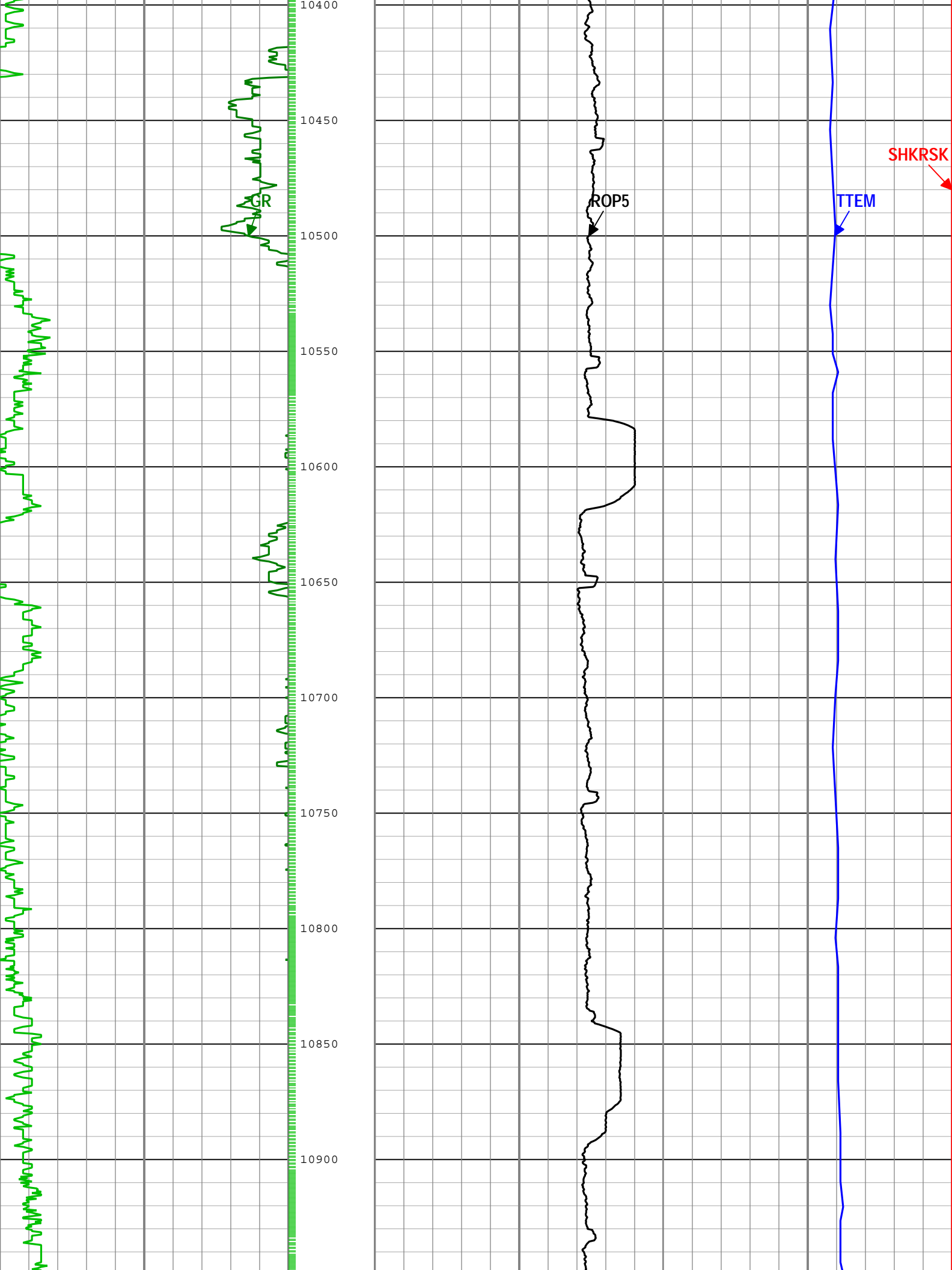








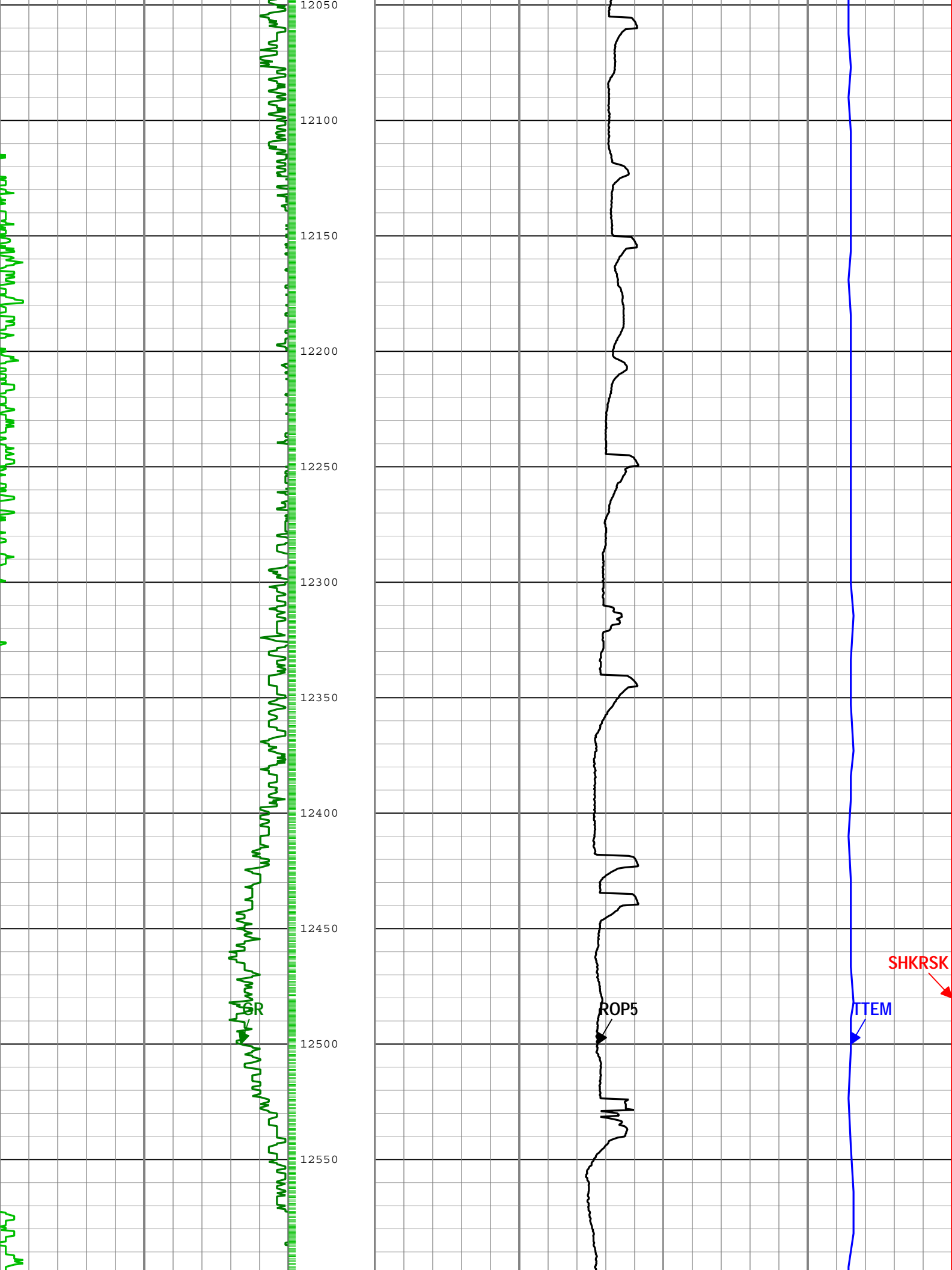


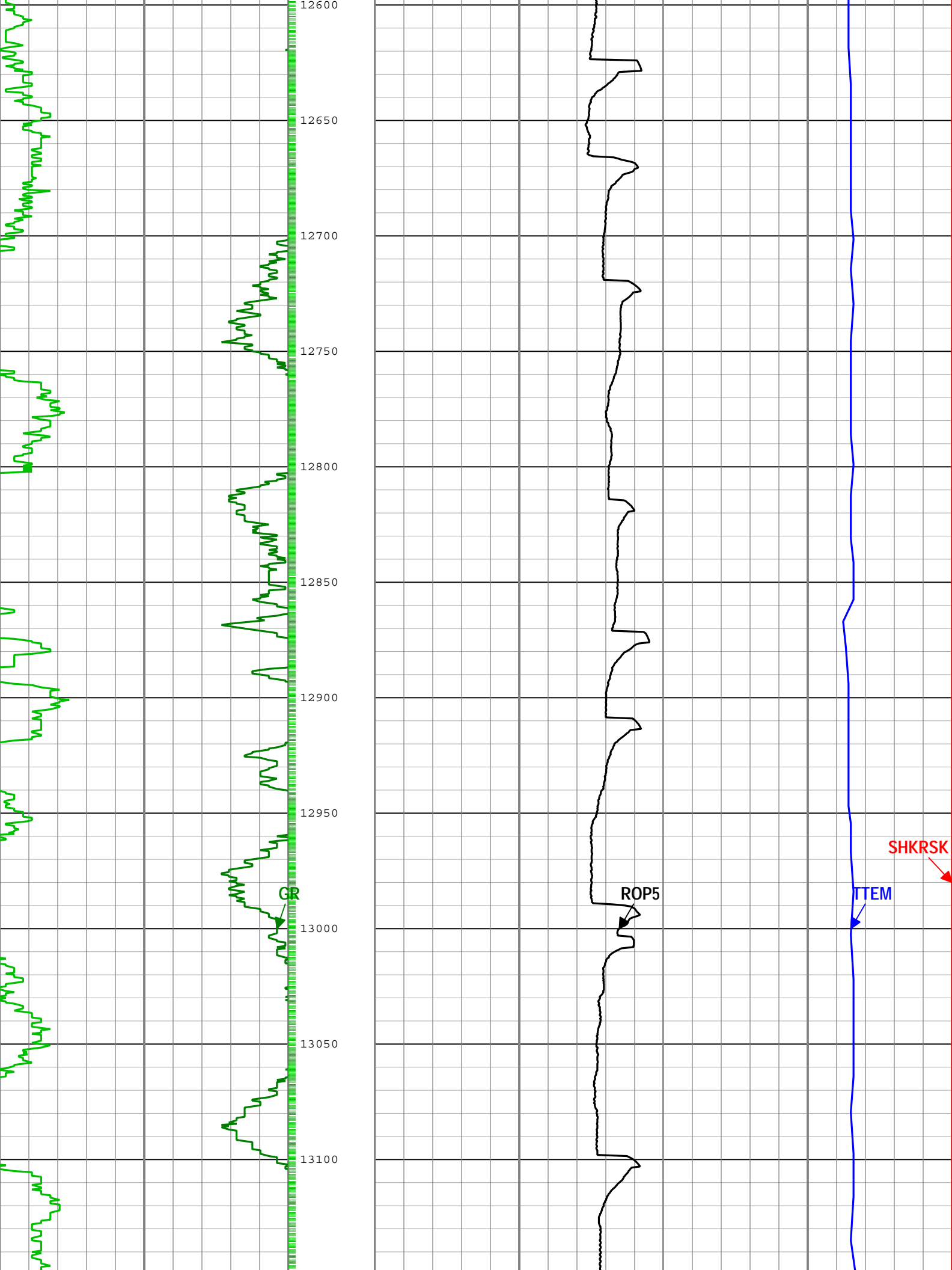


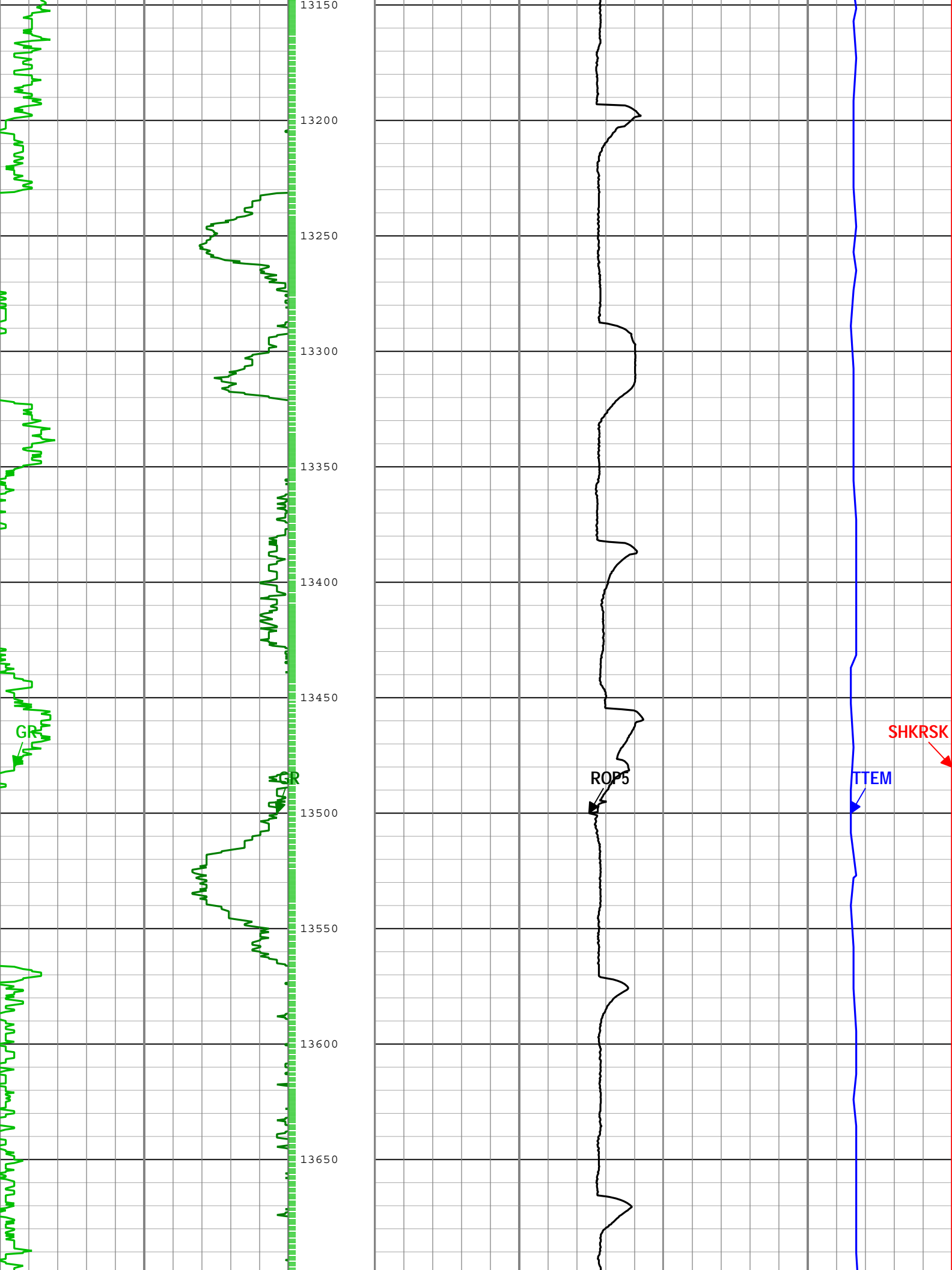


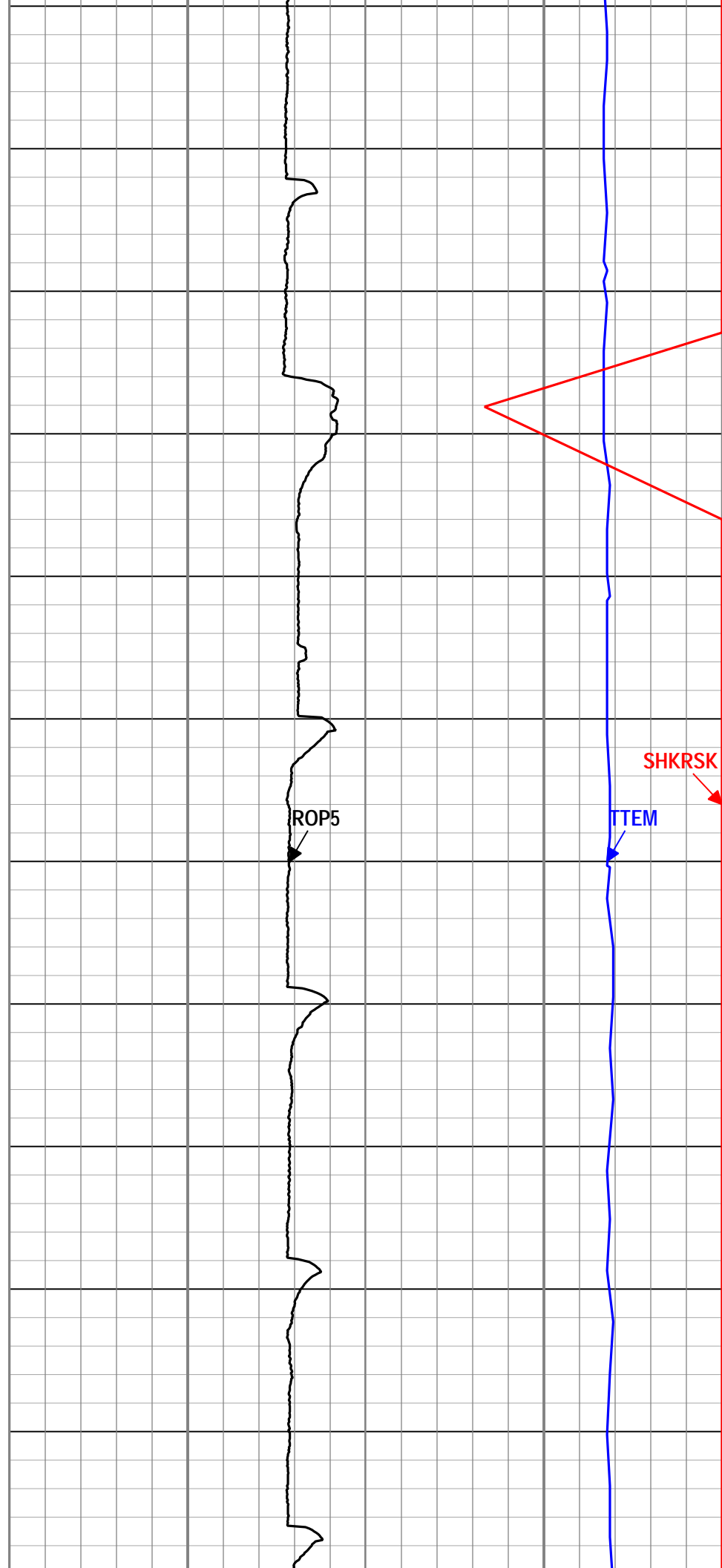
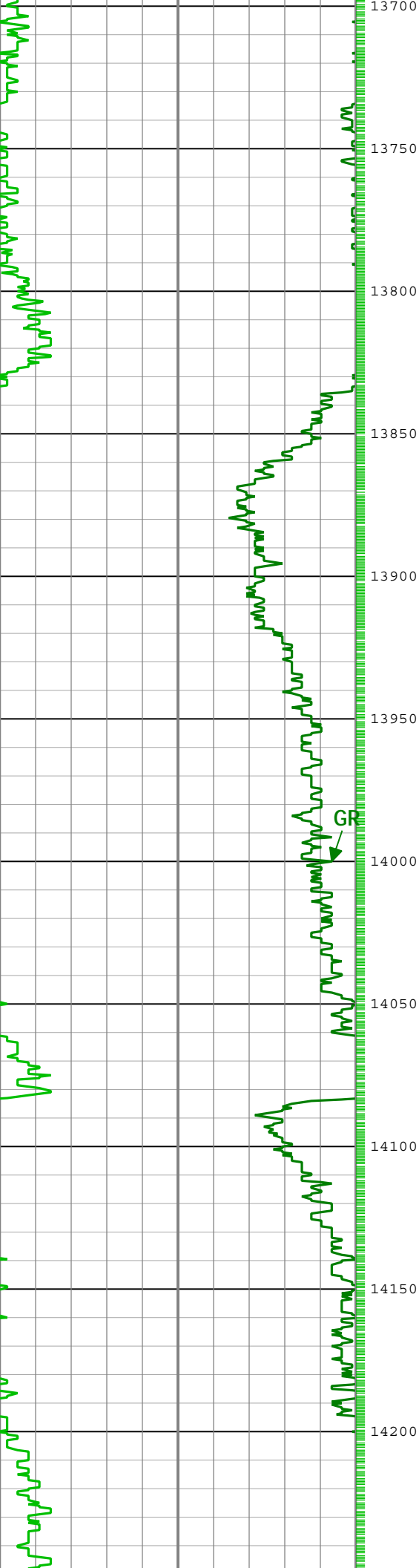


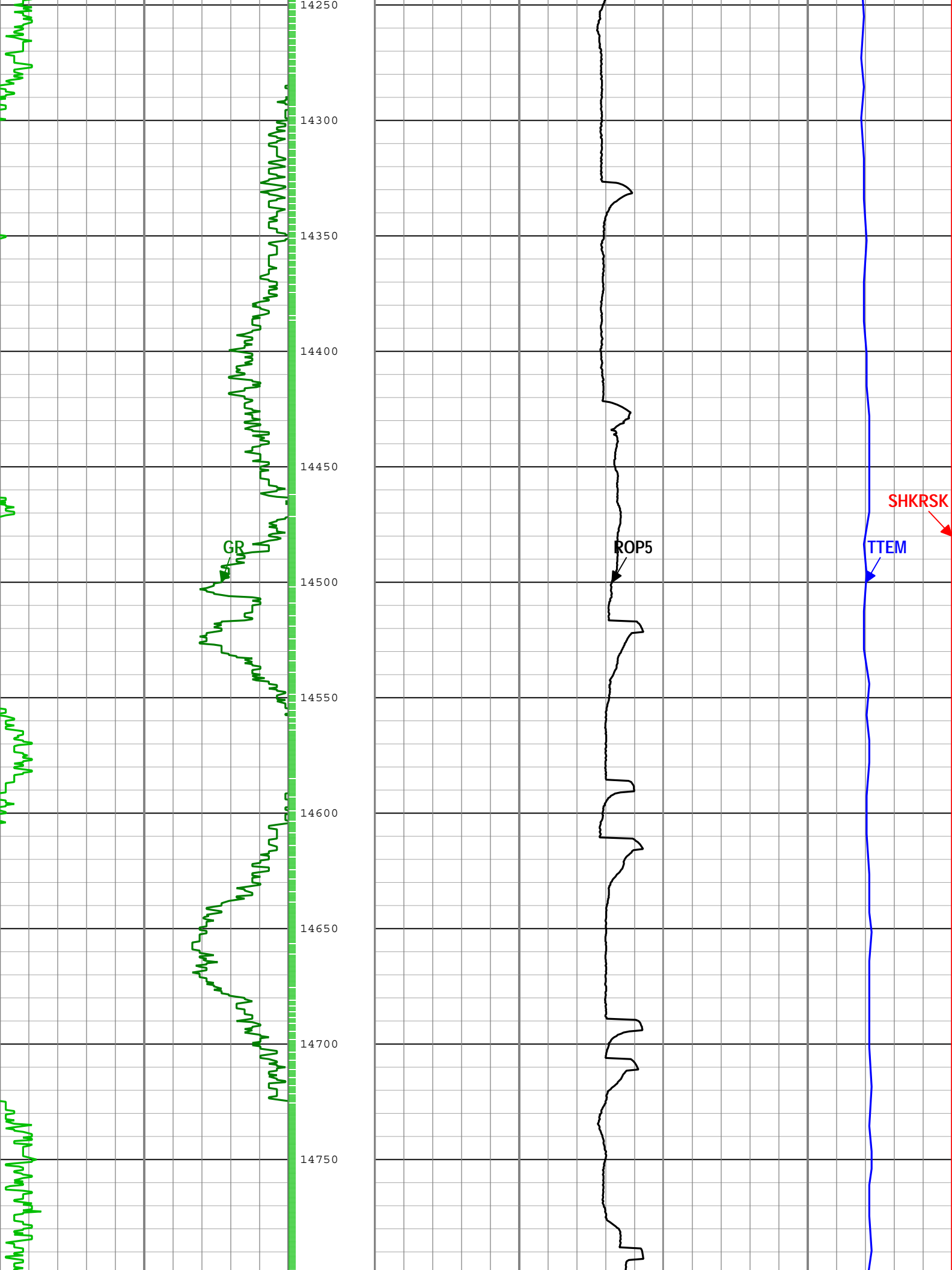




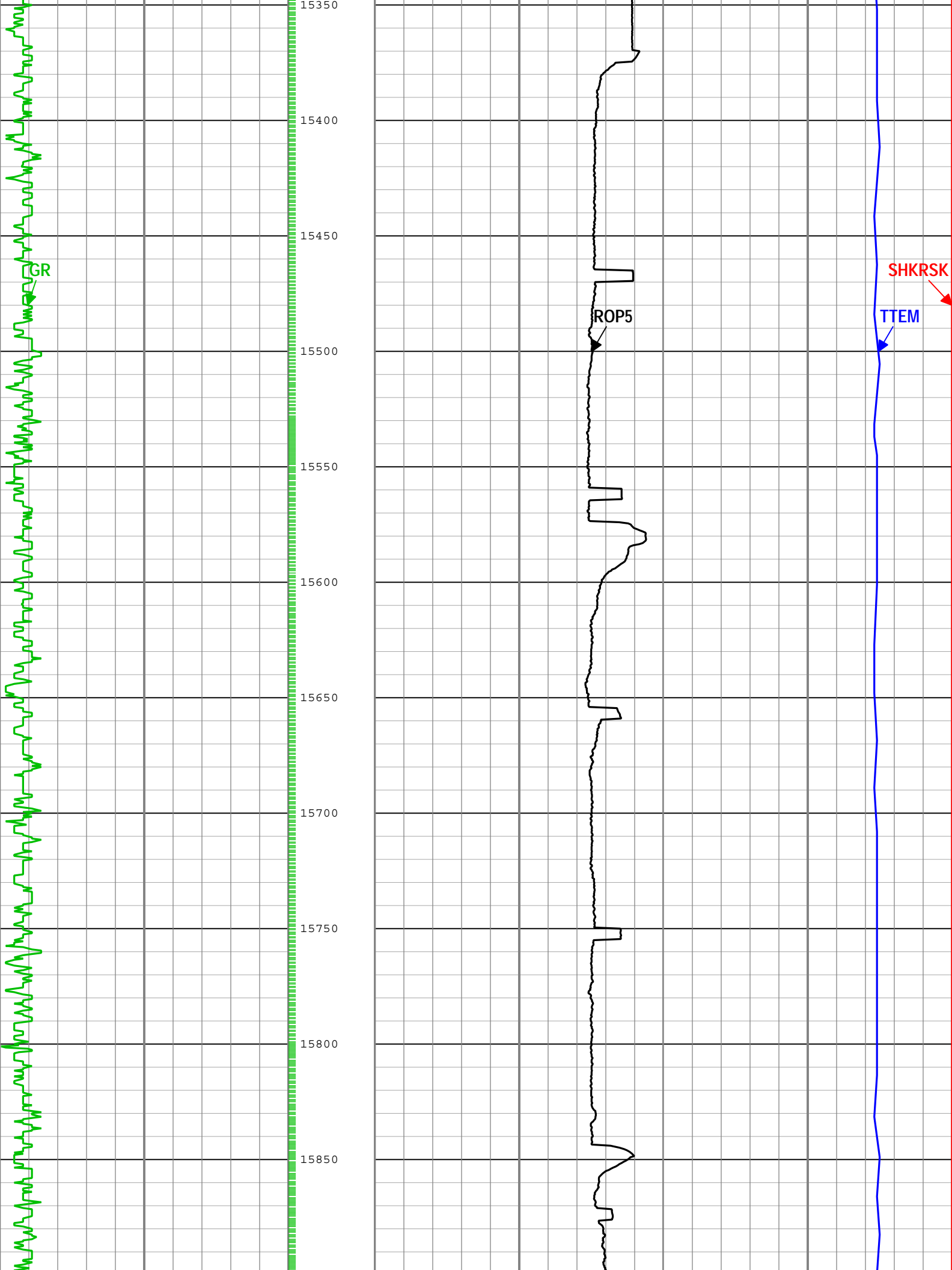




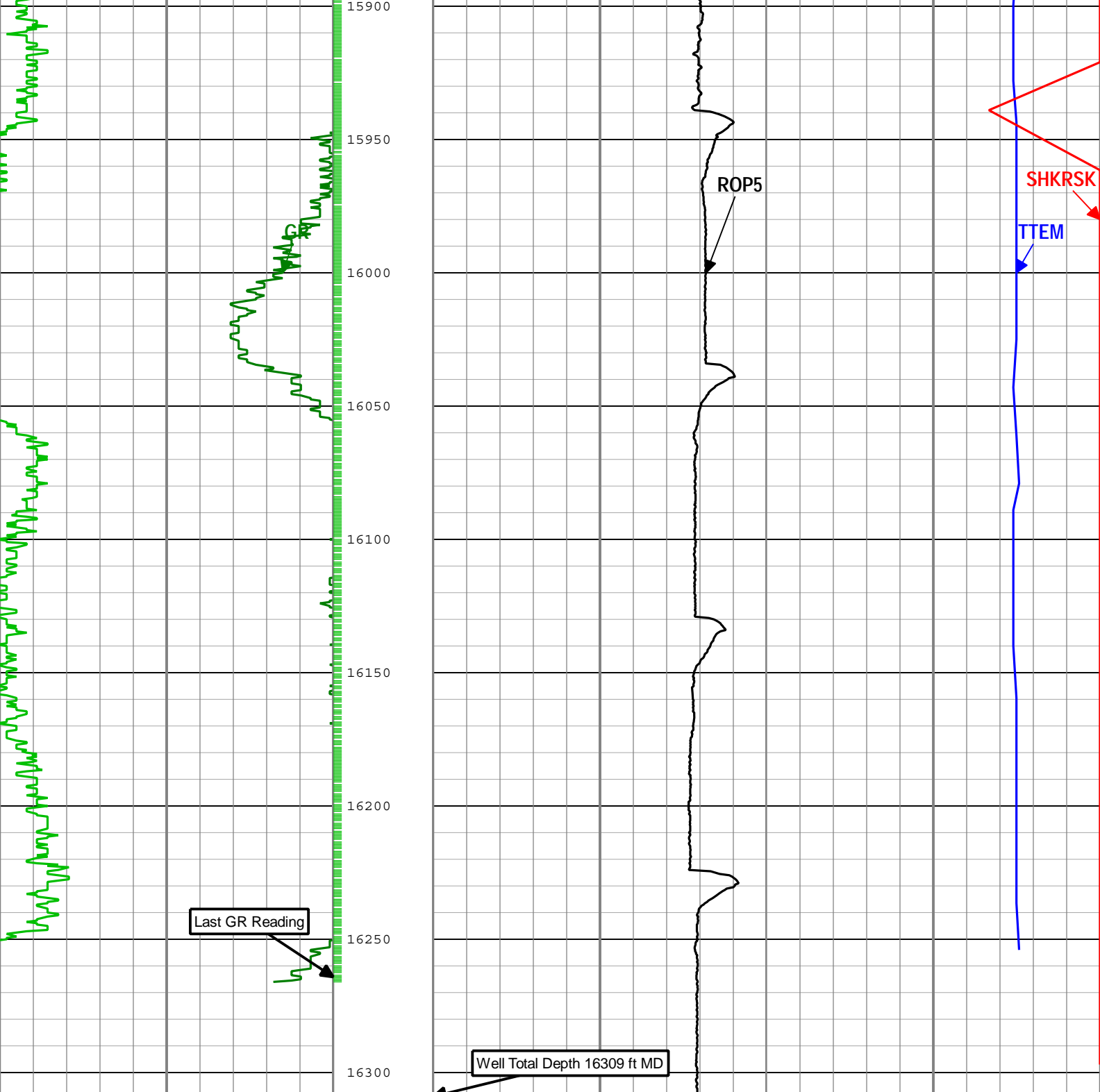












Gamma Ray (GR) SlimPulse[1] RM			Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5) RT			Tool Temperature (TTEM) SlimPulse[1] RM			Shock Risk (SHKRSK) SlimPulse[1] RT		
0	gAPI	150	1000	ft/h	0	100	degF	300	3		0
Gamma Ray (GR) SlimPulse[1] RM											
150	gAPI	300									
Gamma Ray (GR) SlimPulse[1] RM											
300	gAPI	450									
Gamma Ray (GR) SlimPulse[1] RM											
450	gAPI	600									

GR - Gamma Ray SlimPulse[1] RM

## RUN001: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	8.8	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

## RUN001Depth Zoned Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	13.5	840	840
BS	8.75	840	5993

All depth are actual.

## RUN002: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	8.75	in
DFD	Drilling Fluid Density	Borehole	10	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

## RUN003: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	9.8	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

## RUN003Depth Zoned Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	8.75	6911.01	6980
BS	6.125	6980	16309

All depth are actual.

## Tool Control Parameters

## Well Composite

## Software Version

Acquisition System	Version
MaxWell	4.0.9163.3000
Application Patch	Patch-SP-10767_22480-4.0.9163.3001
	Patch-NPD_ADN8D_SP3-23661-4.0.9530.3002
	Patch-Hotfix_overwrite_survey_for_petrolink-23199-4.0.9530.3002
	Patch-Hotfix_MRT_SP3-23306-4.0.9530.3002

Tool Elements	Description	Software Version	Firmware Version
DRILLING_SURFACE	DRILLING_SURFACE	4.0.9469.3000	
SPEC	SlimPulse Electronics Cartridge	4.0.9469.3000	

## Composite Summary

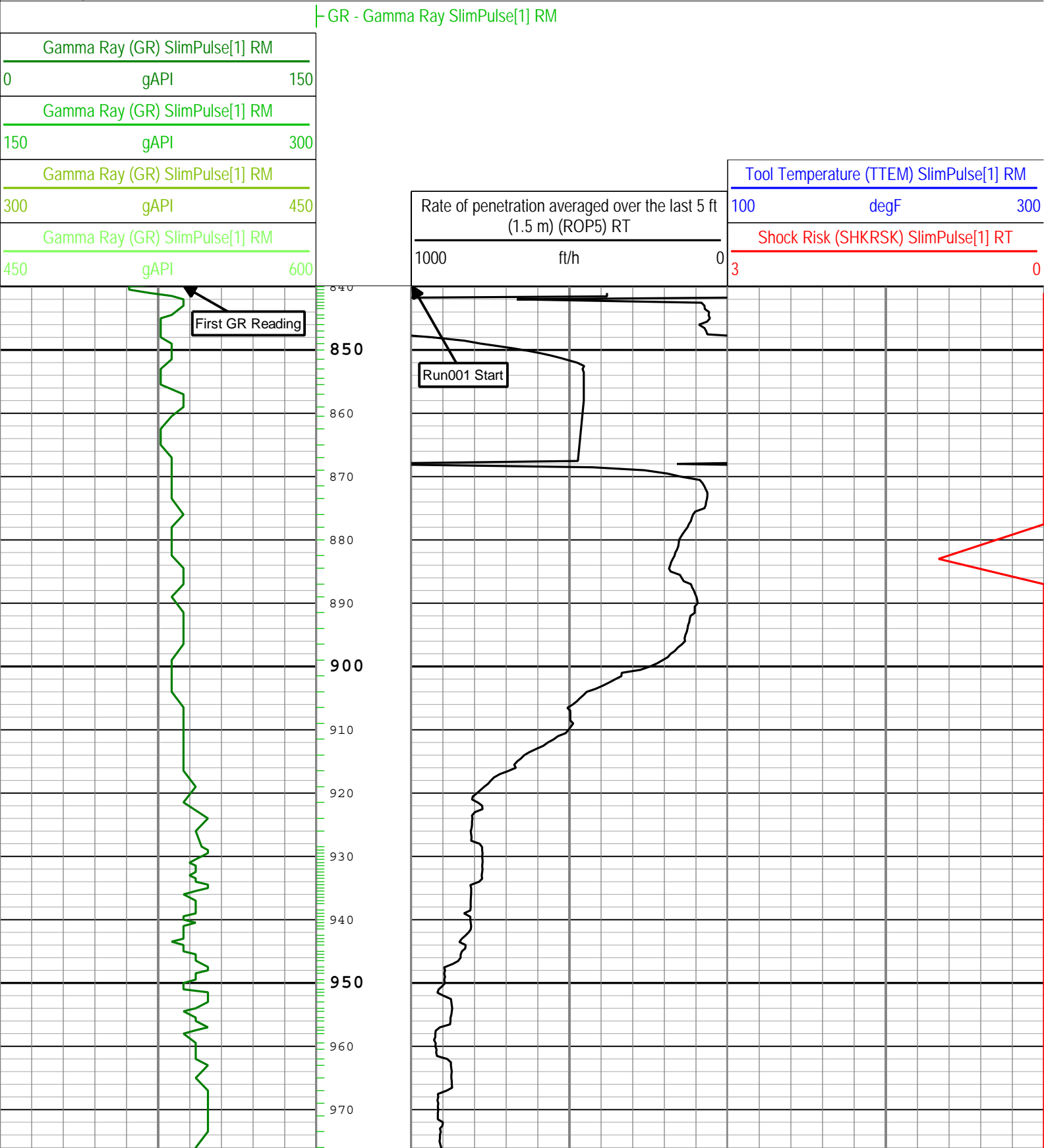
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
RUN001	Drilling	Down	840.17 ft	5993.50 ft	27-Jul-2014 2:49:22 PM	28-Jul-2014 3:58:03 PM	No
RUN001	Ream Down 1	Down	840.08 ft	841.33 ft	27-Jul-2014 2:51:58 PM	27-Jul-2014 2:52:58 PM	No
RUN002	Drilling	Down	5993.67 ft	6980.33 ft	29-Jul-2014 12:53:54 AM	30-Jul-2014 4:30:44 AM	No

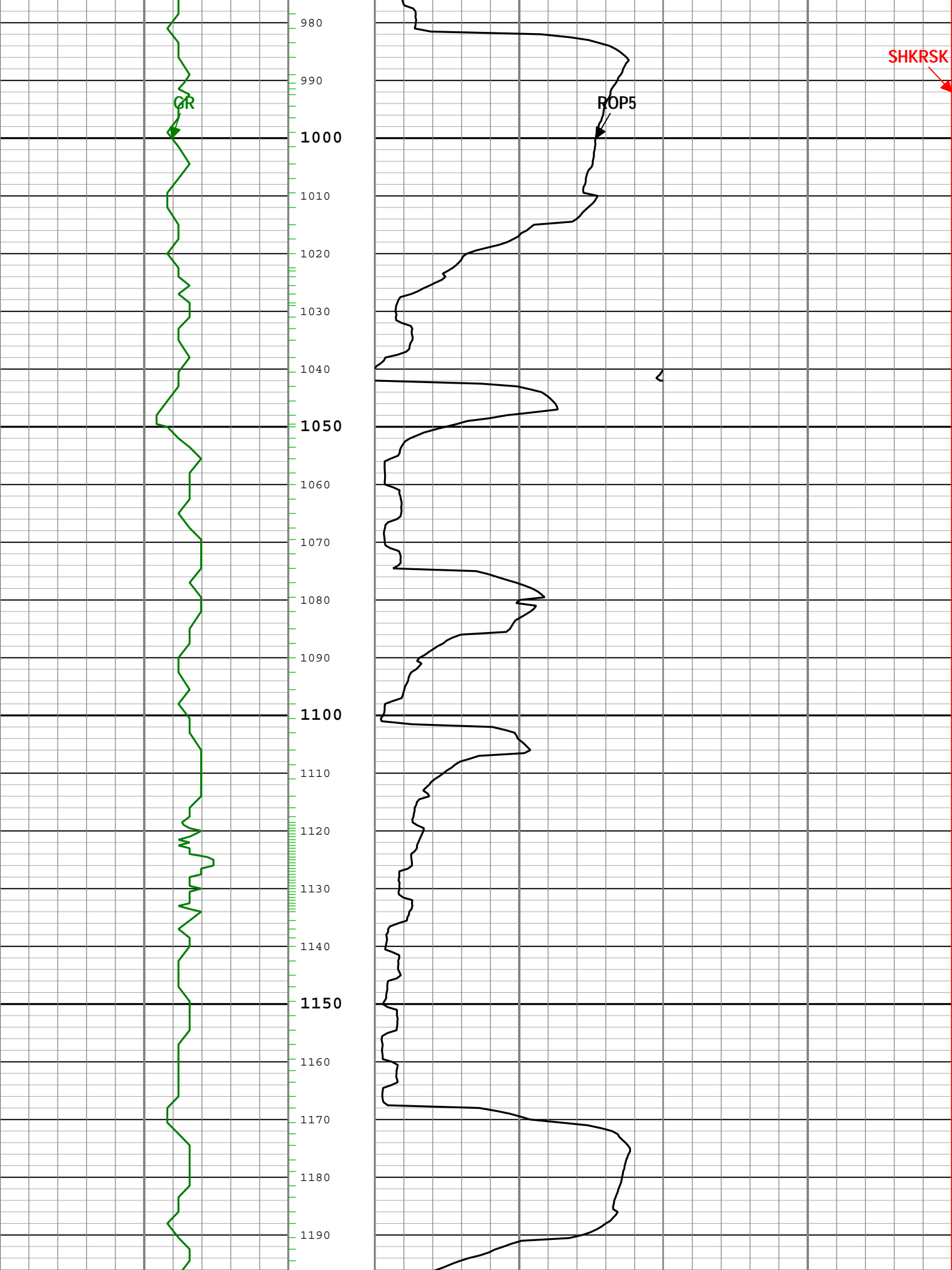
RUN002	Ream Down 1	Down	5904.08 ft	5993.58 ft	29-Jul-2014 12:33:35 AM	29-Jul-2014 12:53:54 AM	No
RUN003	Ream Down 1	Down	6969.75 ft	6978.00 ft	31-Jul-2014 1:47:50 PM	31-Jul-2014 2:41:55 PM	No
RUN003	Drilling	Down	6978.00 ft	16311.50 ft	31-Jul-2014 2:41:55 PM	04-Aug-2014 7:03:00 PM	No

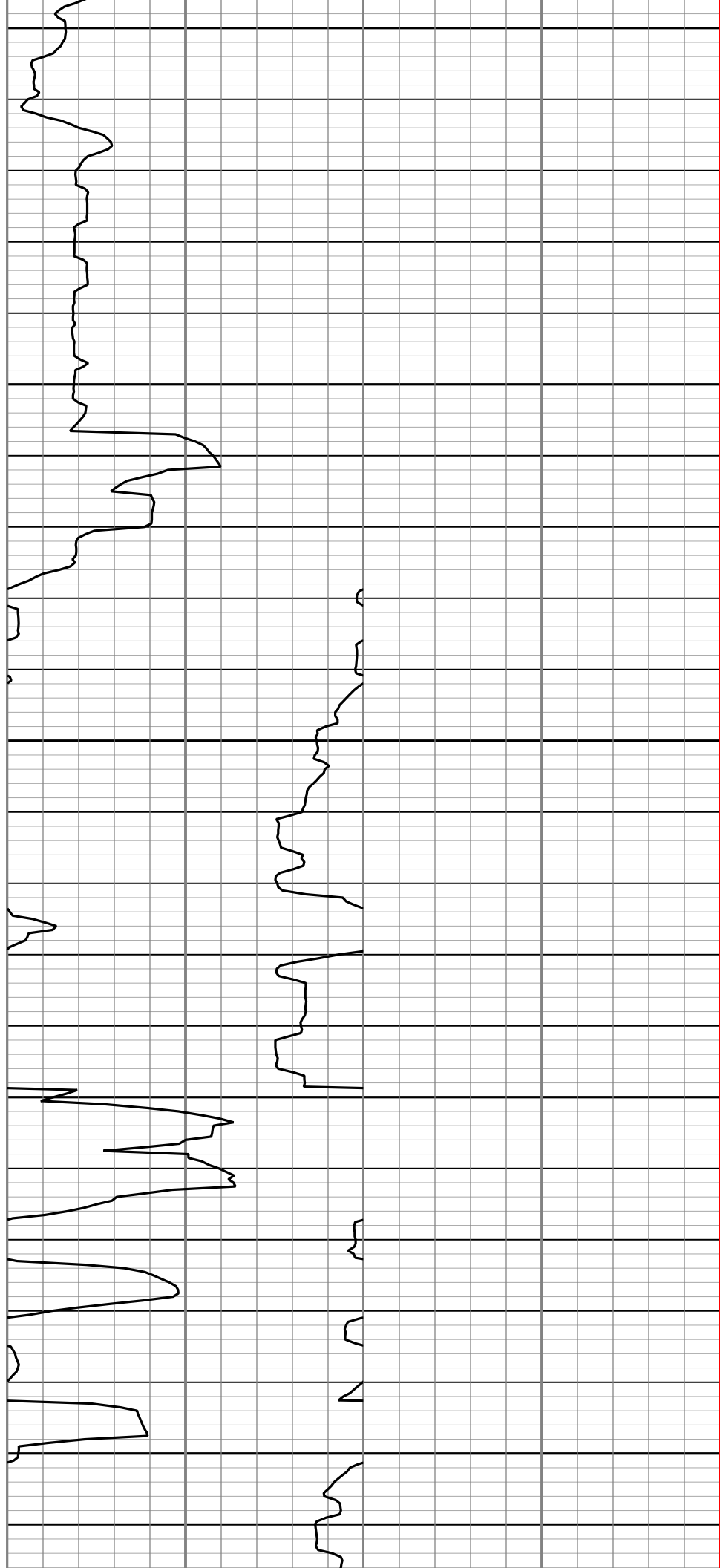
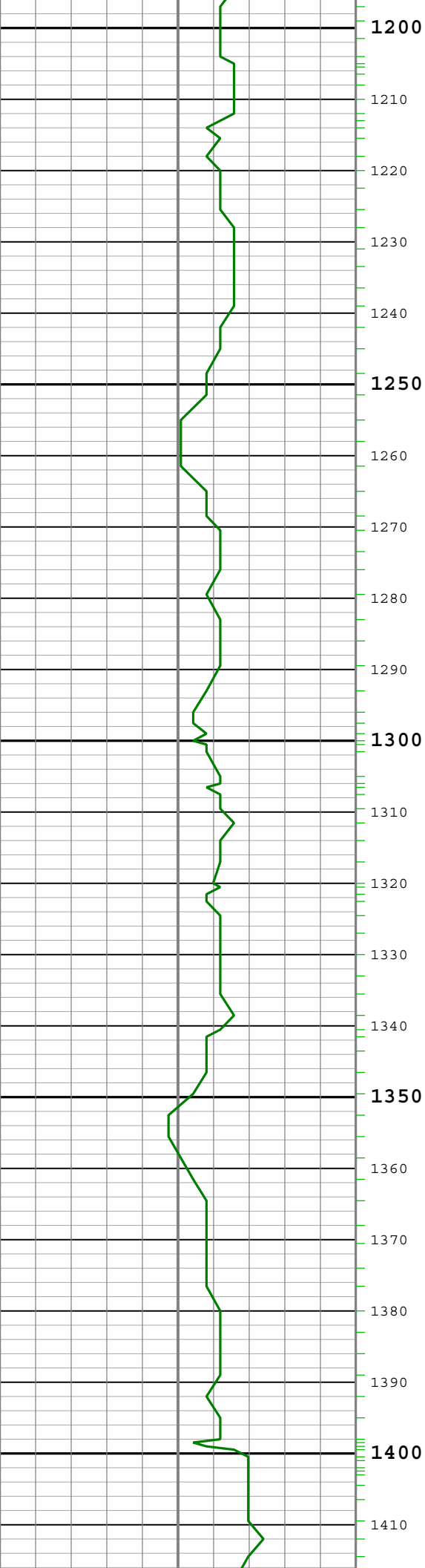
All depths are referenced to toolstring zero

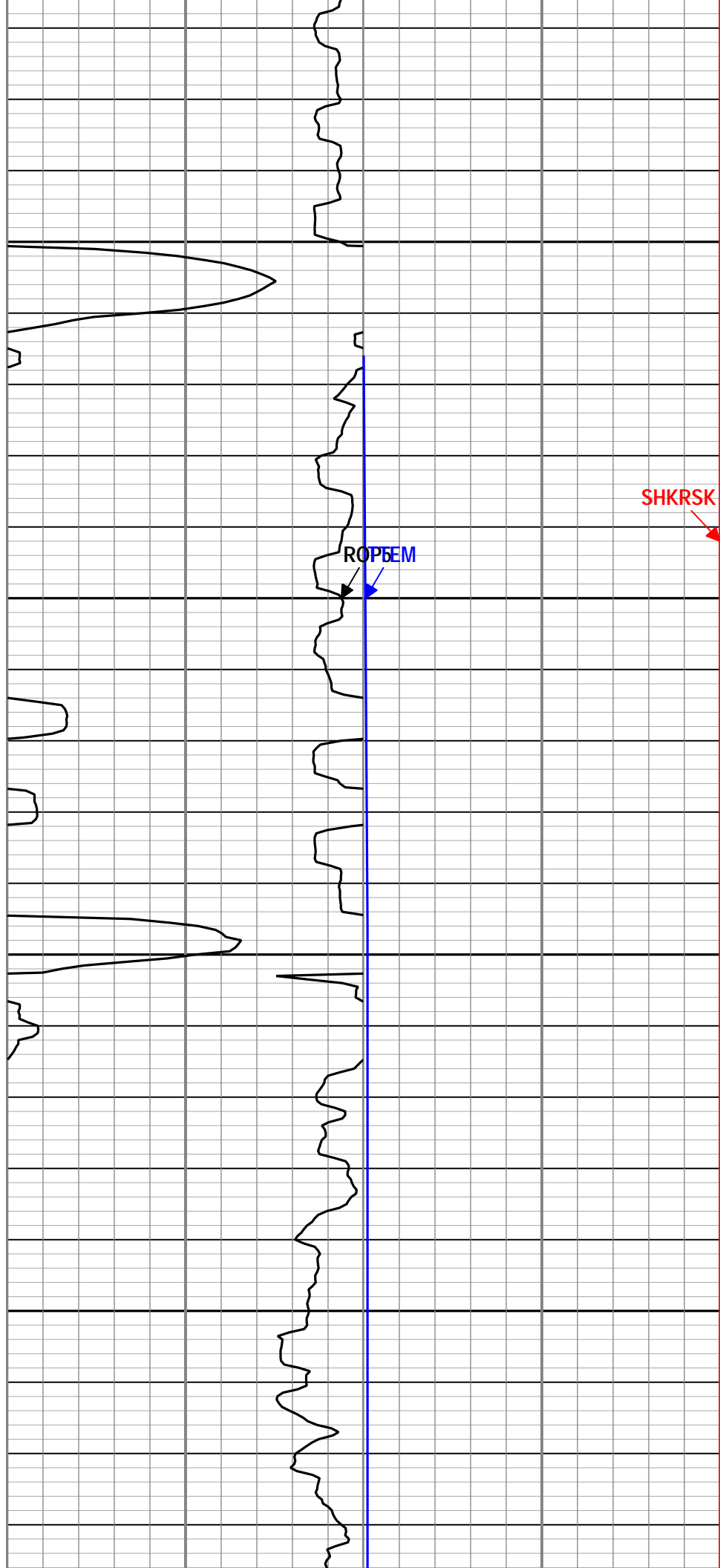
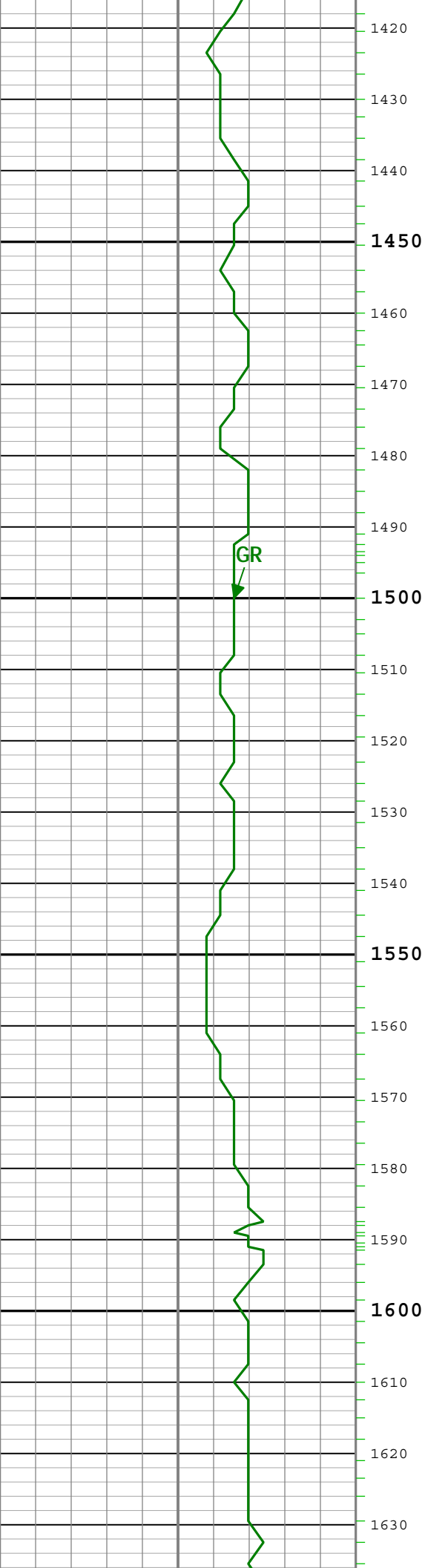
Log	Company:Noble Energy INC	Well:NCLP AA06-64-1AHNA	Well Composite:S222
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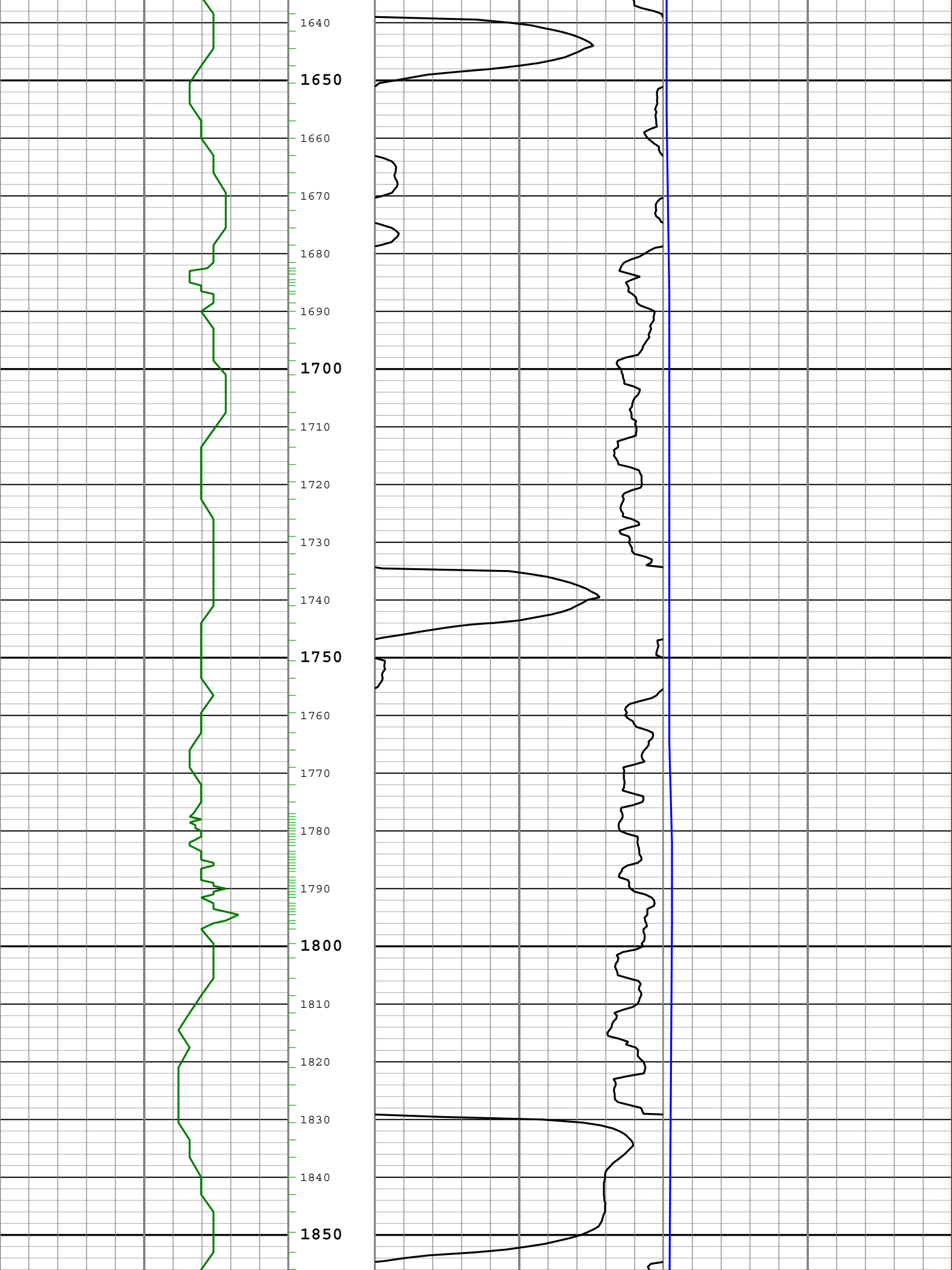
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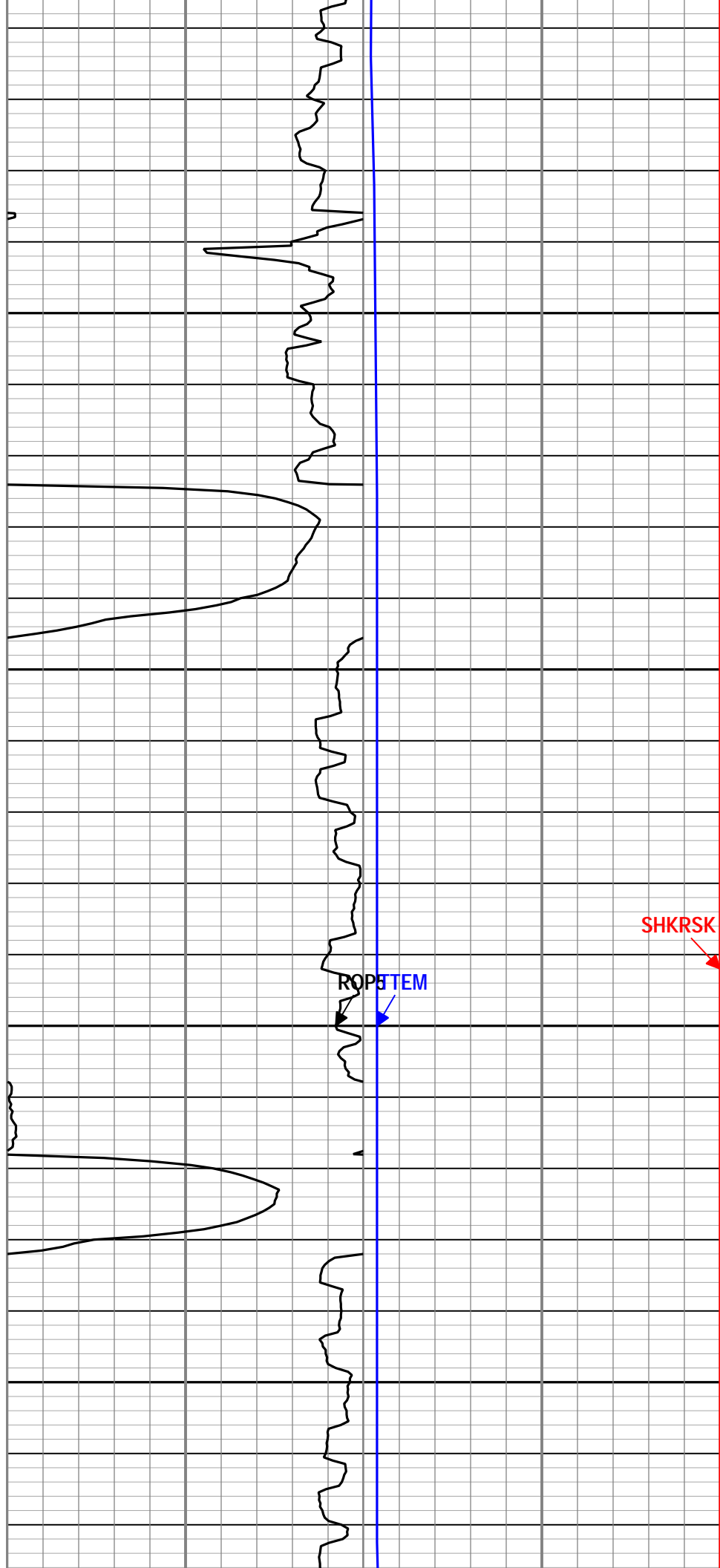
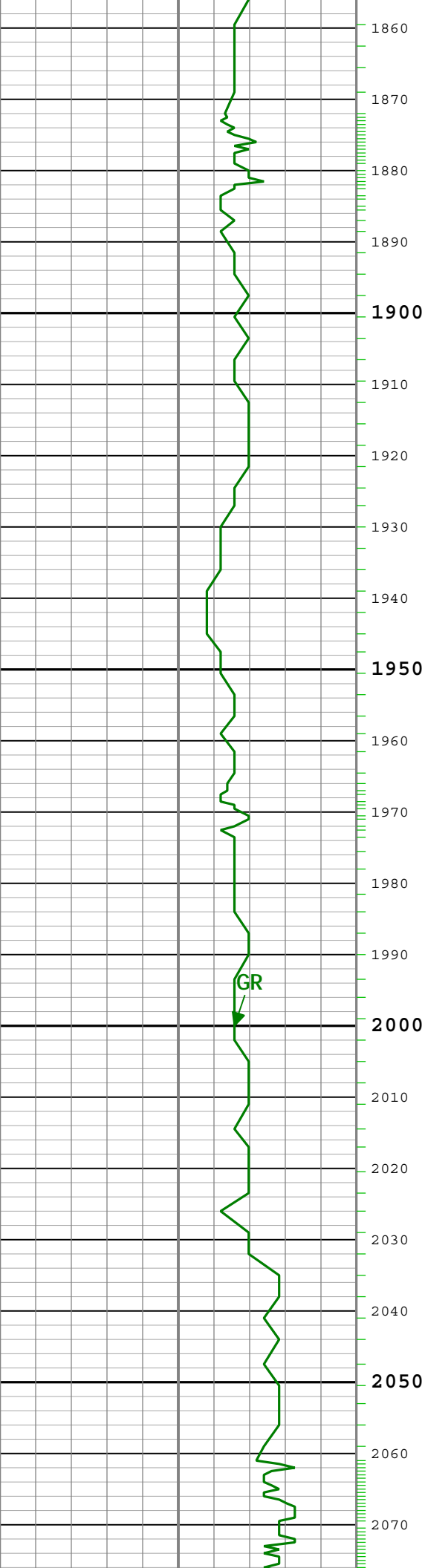




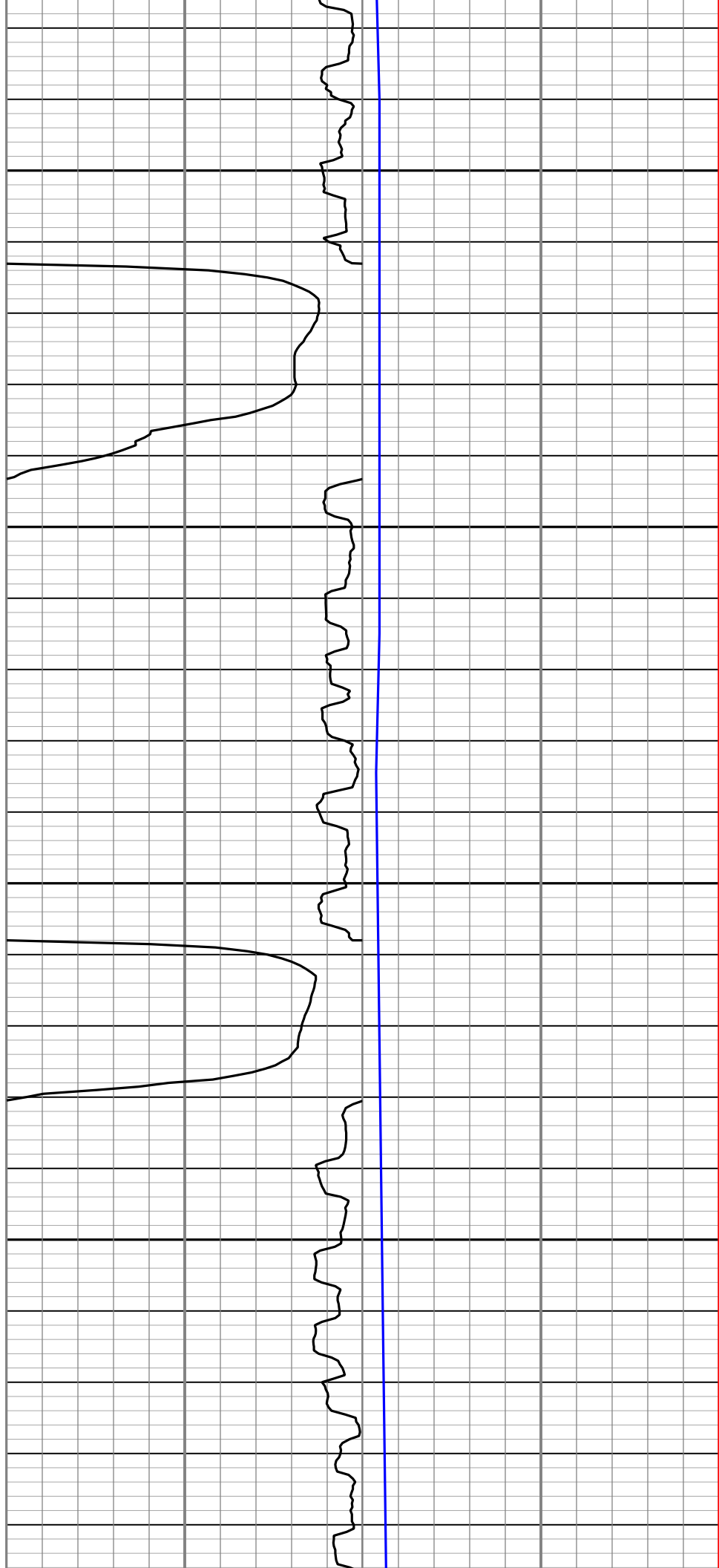
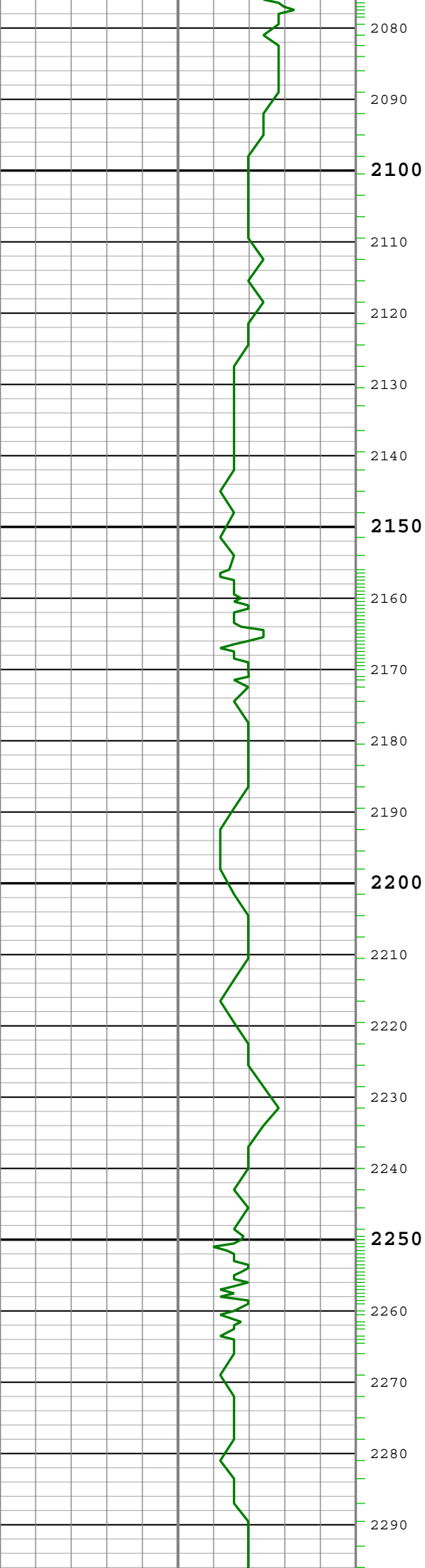


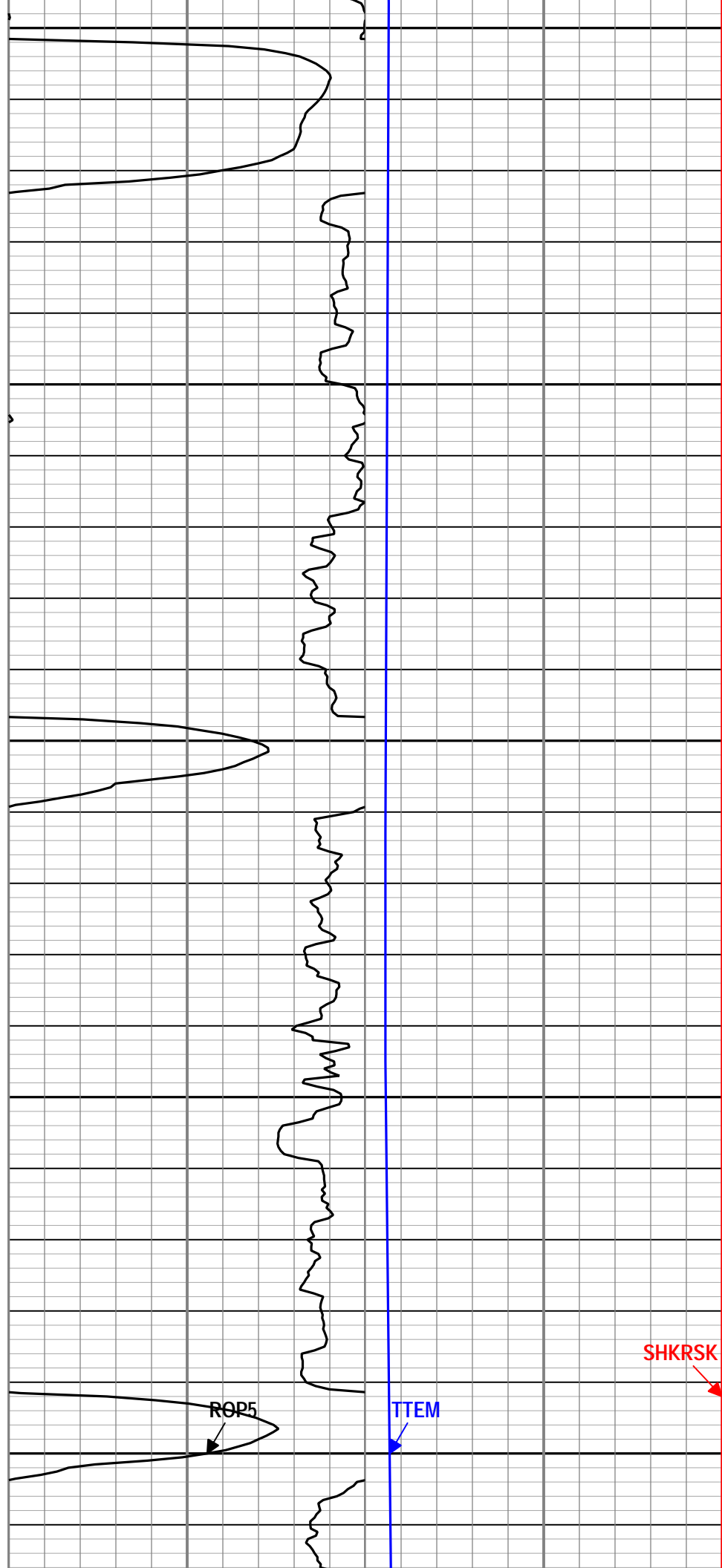
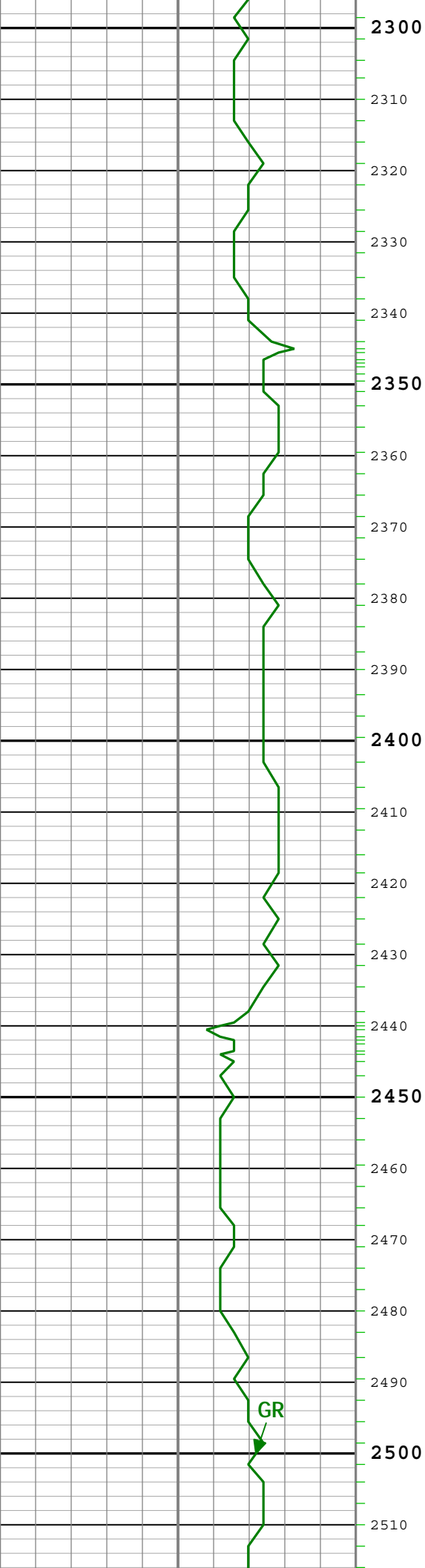


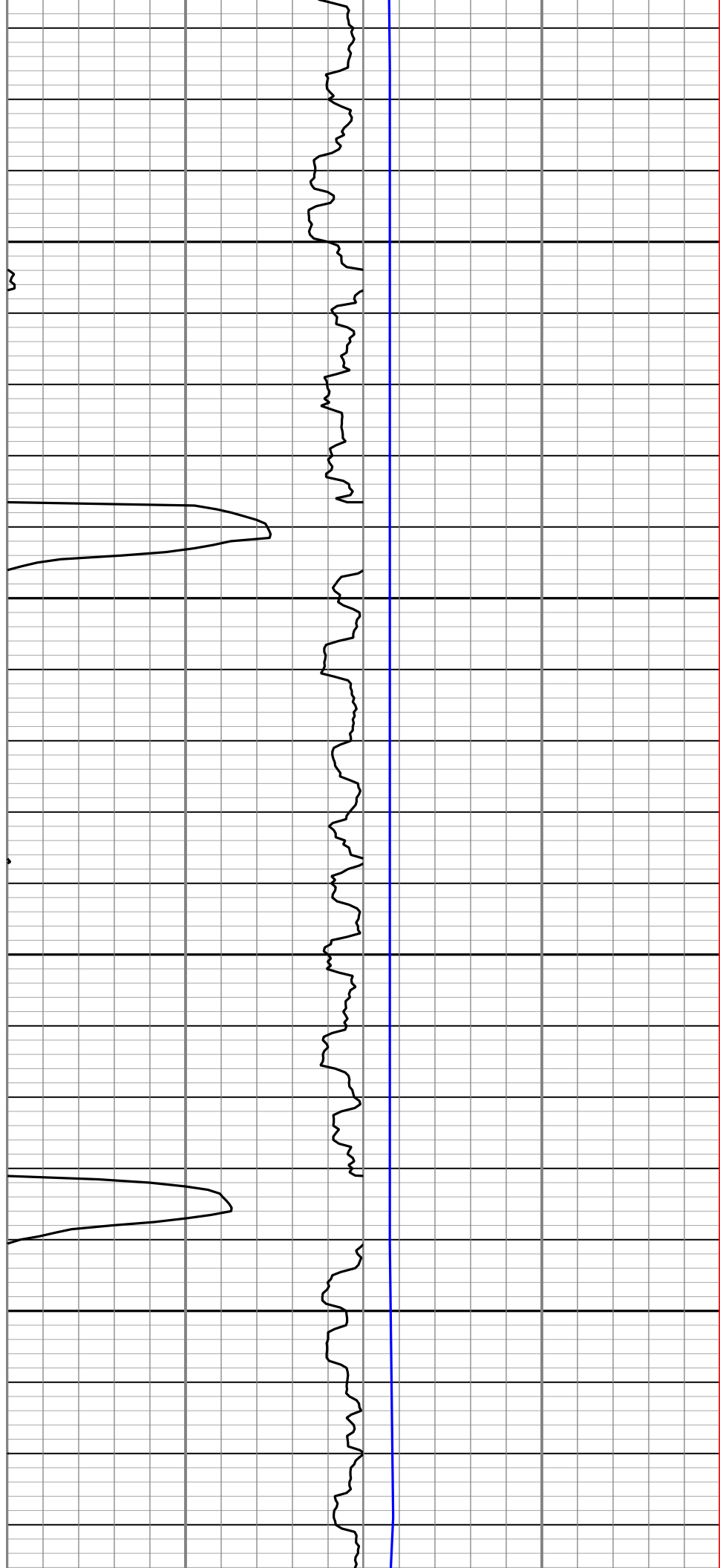
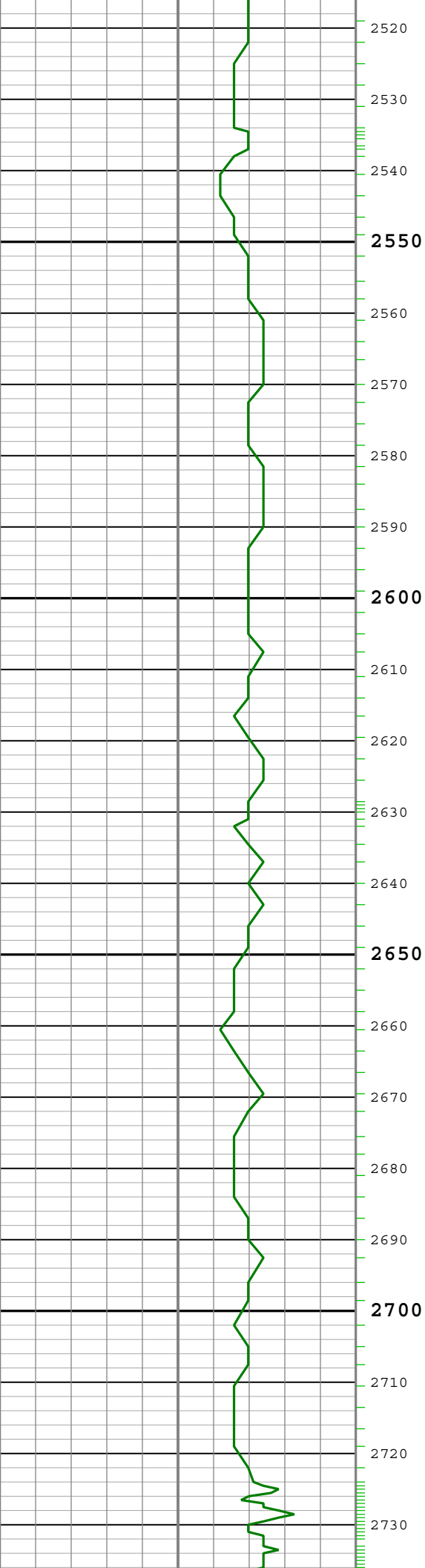


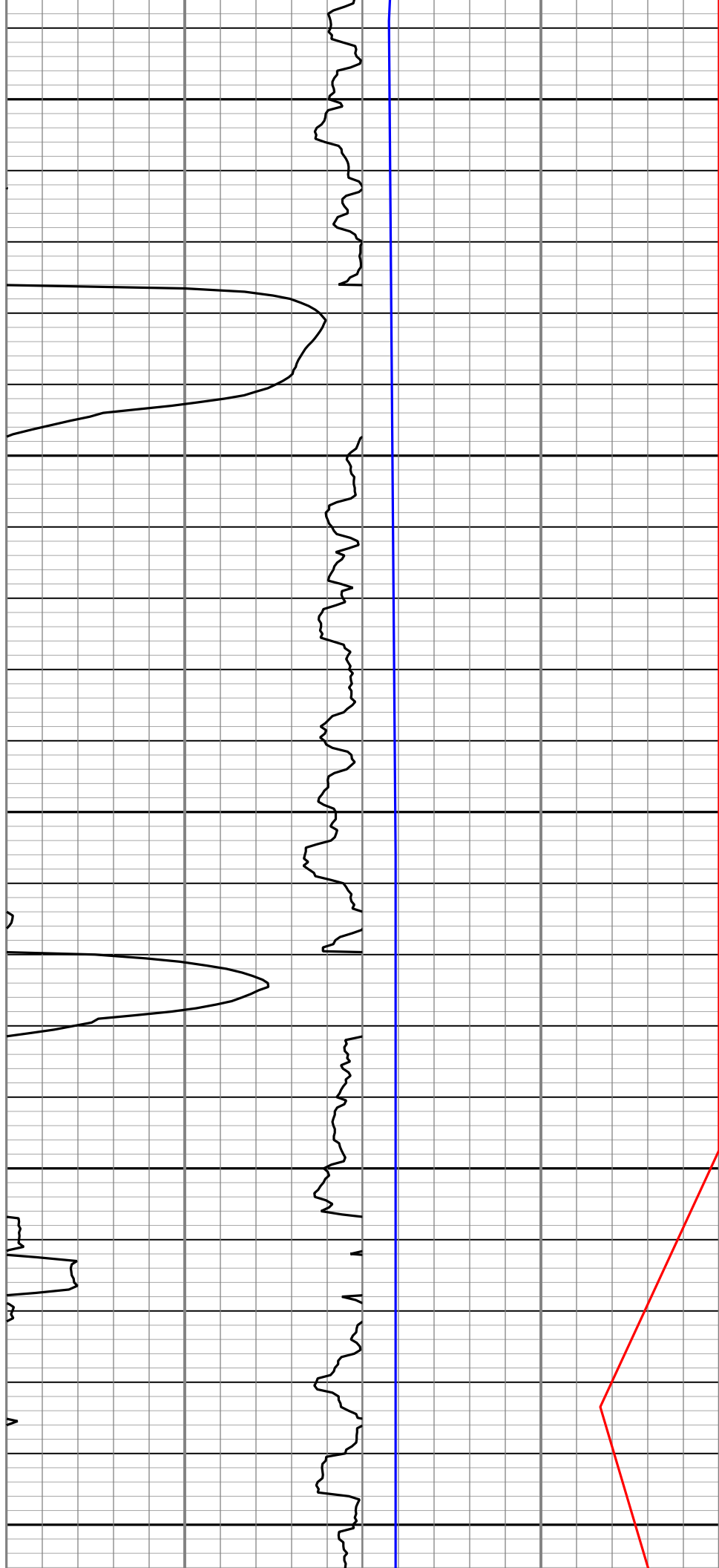
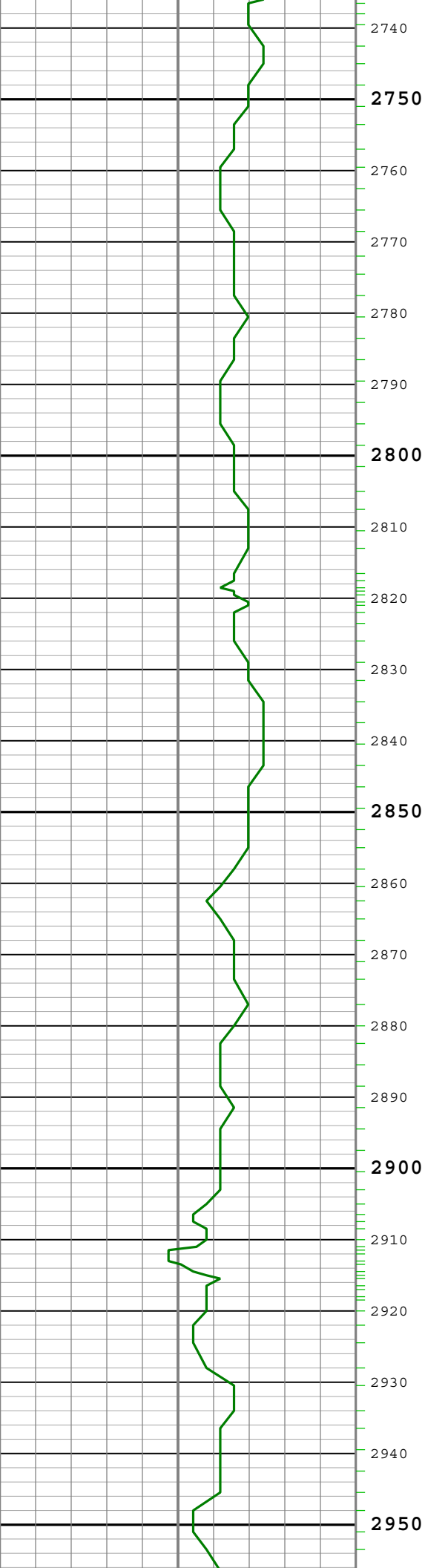


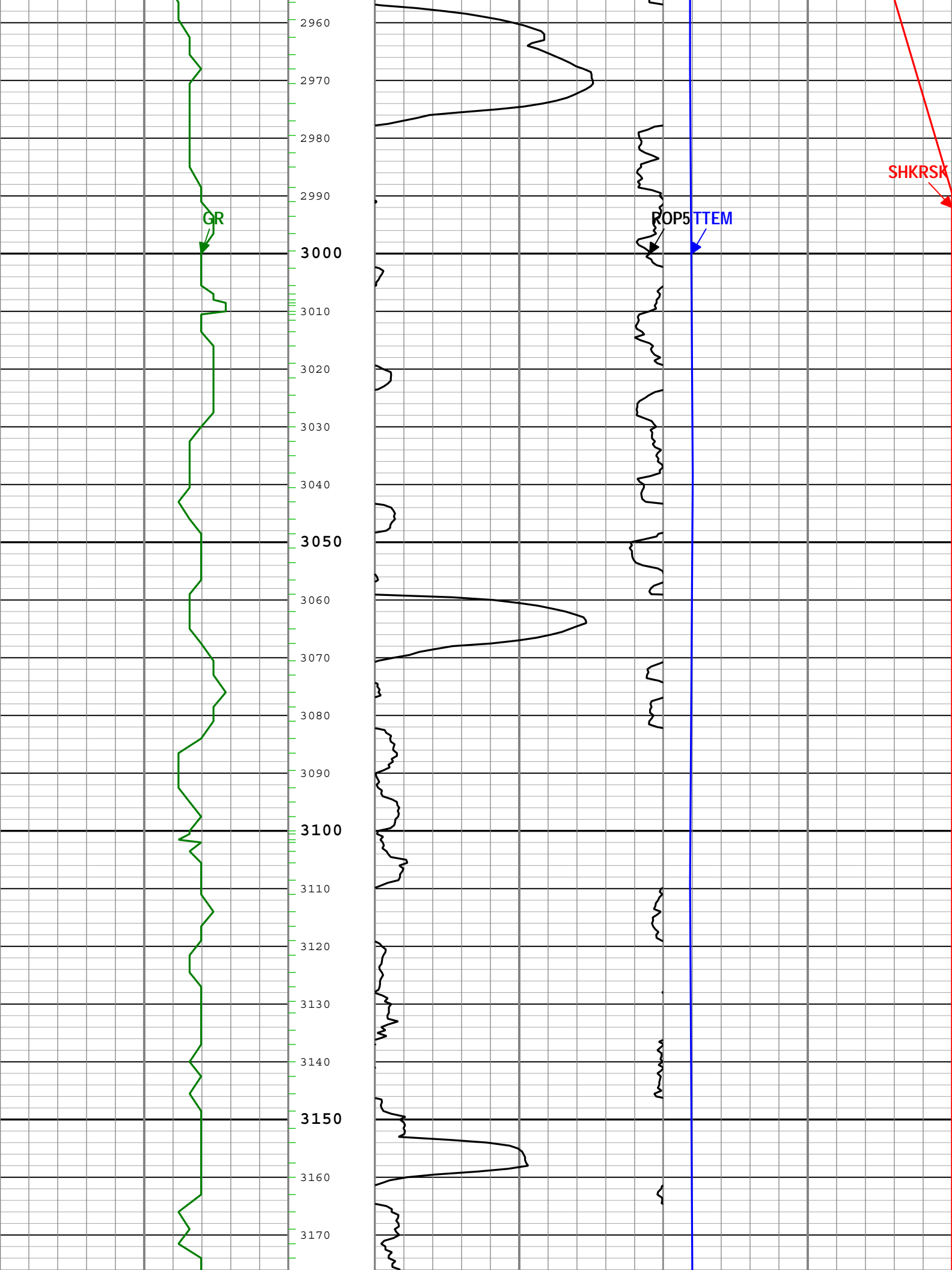


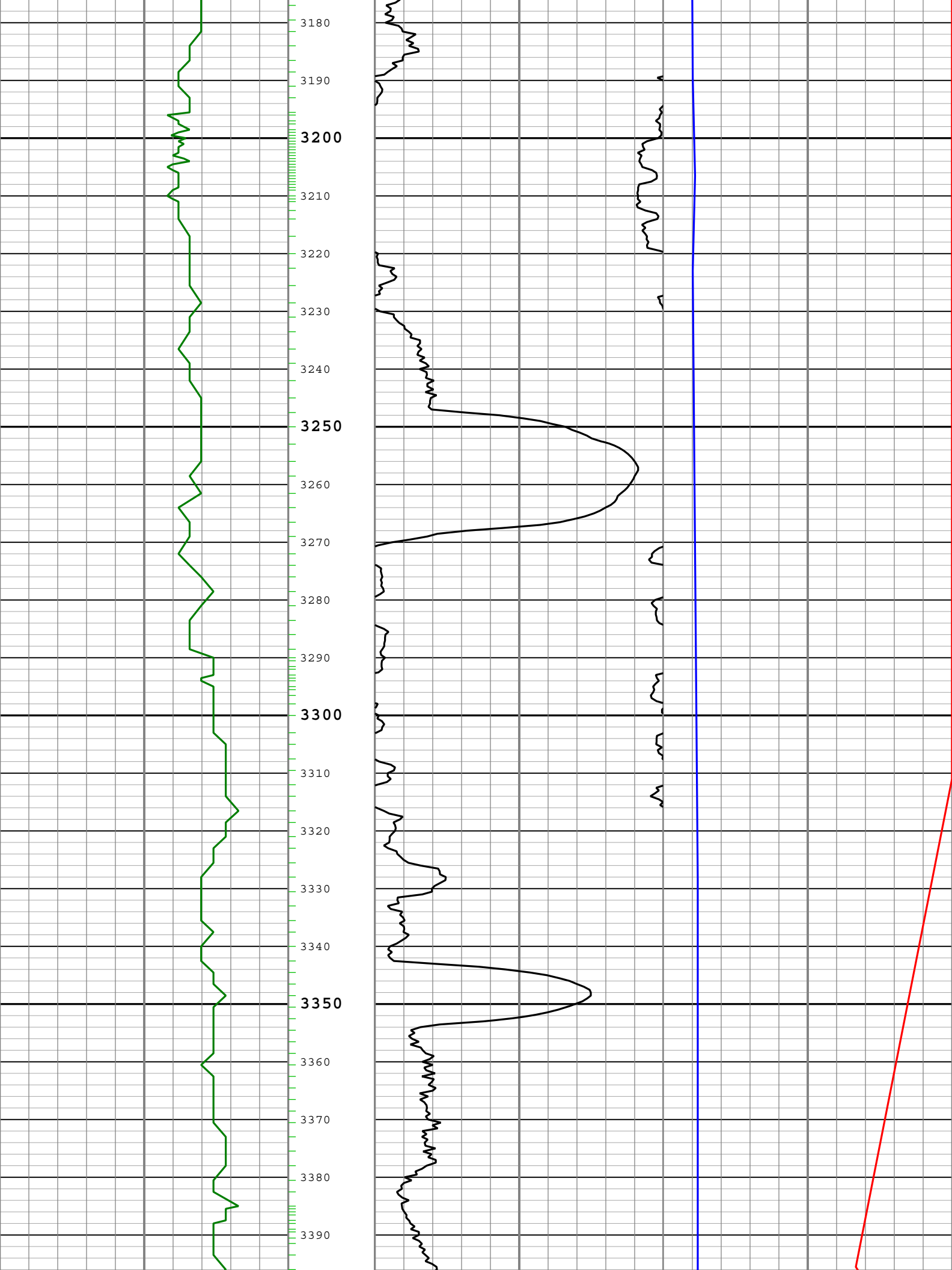


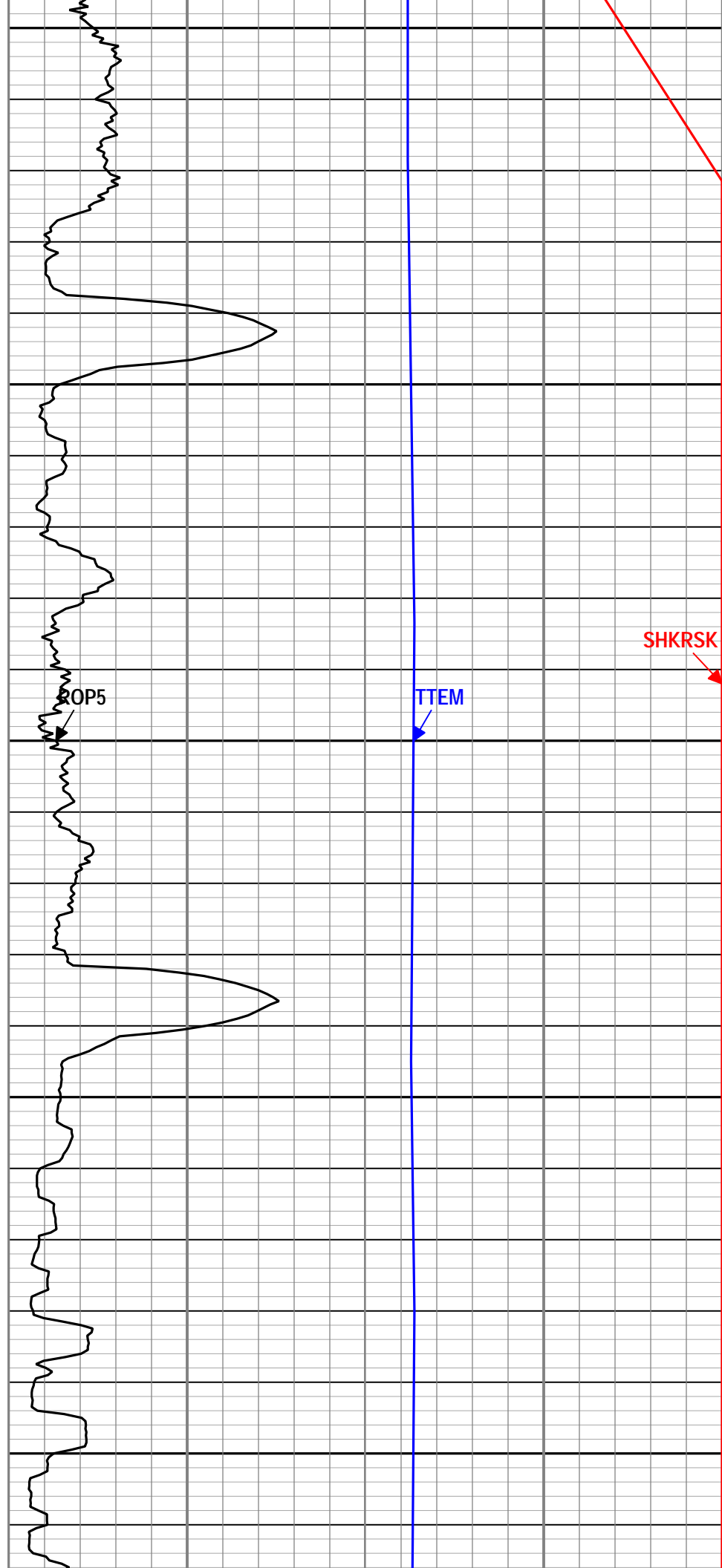
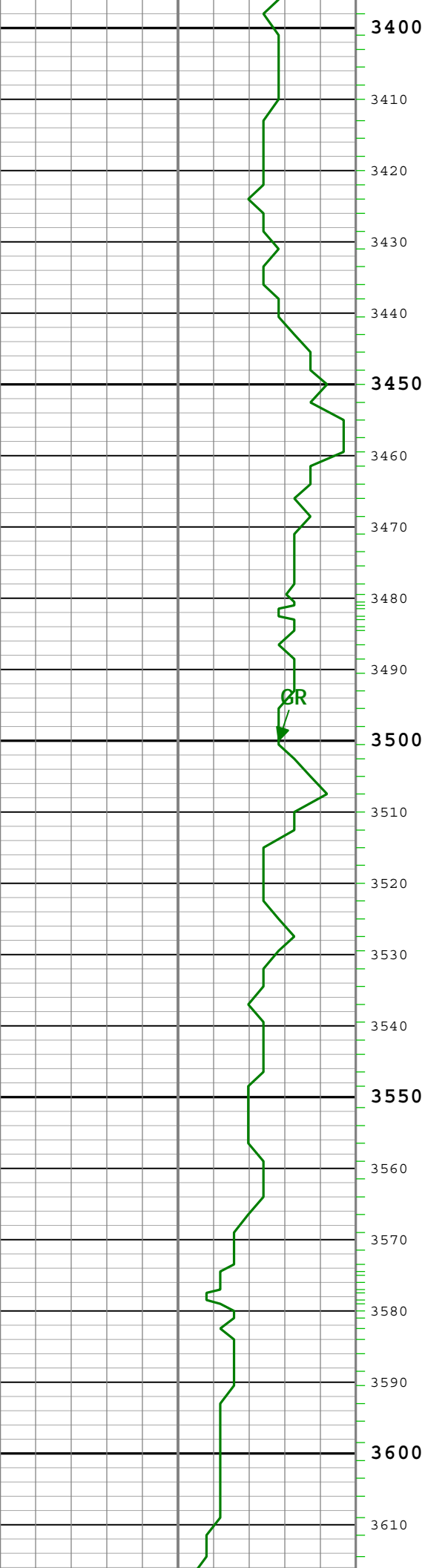


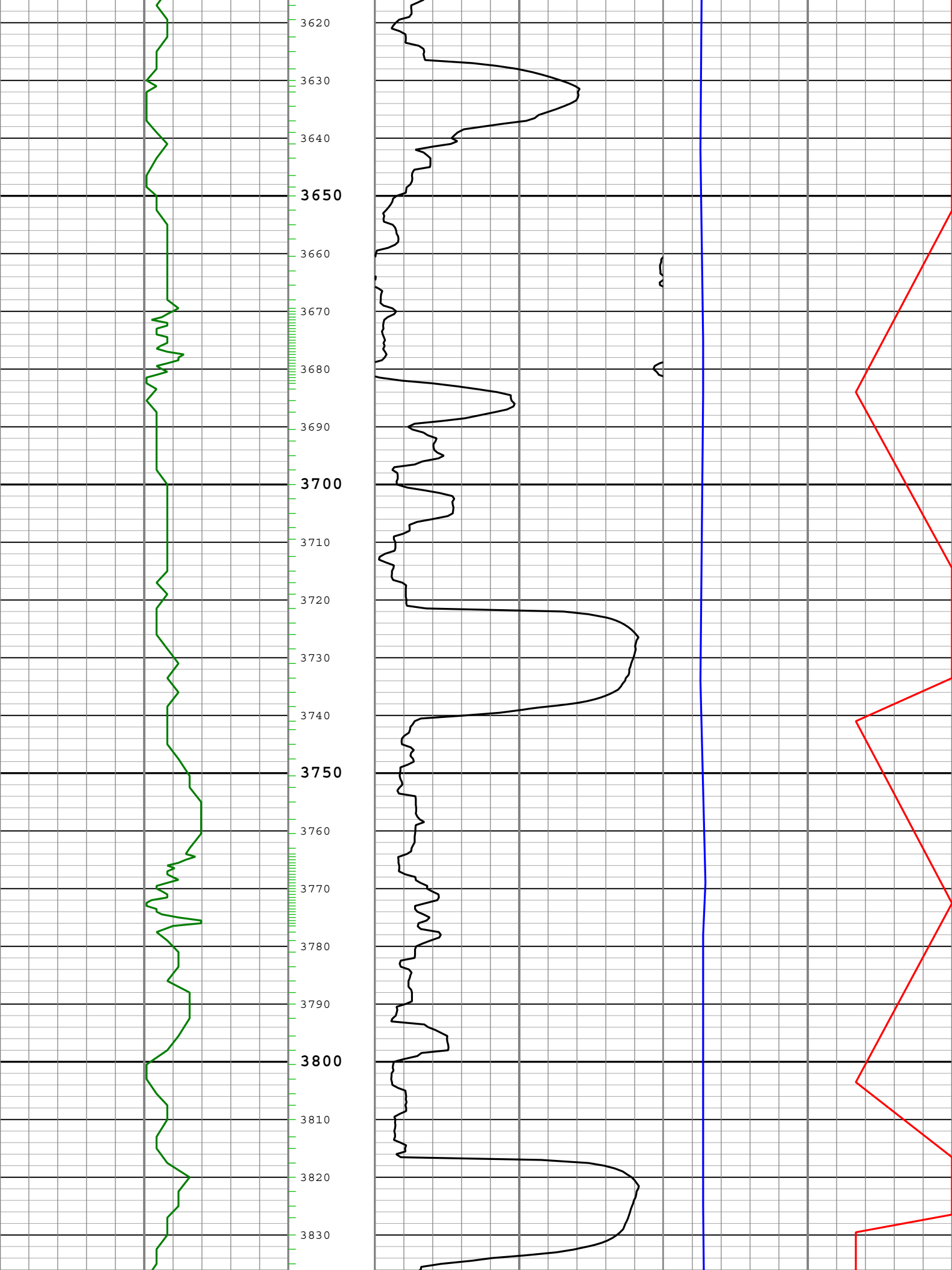




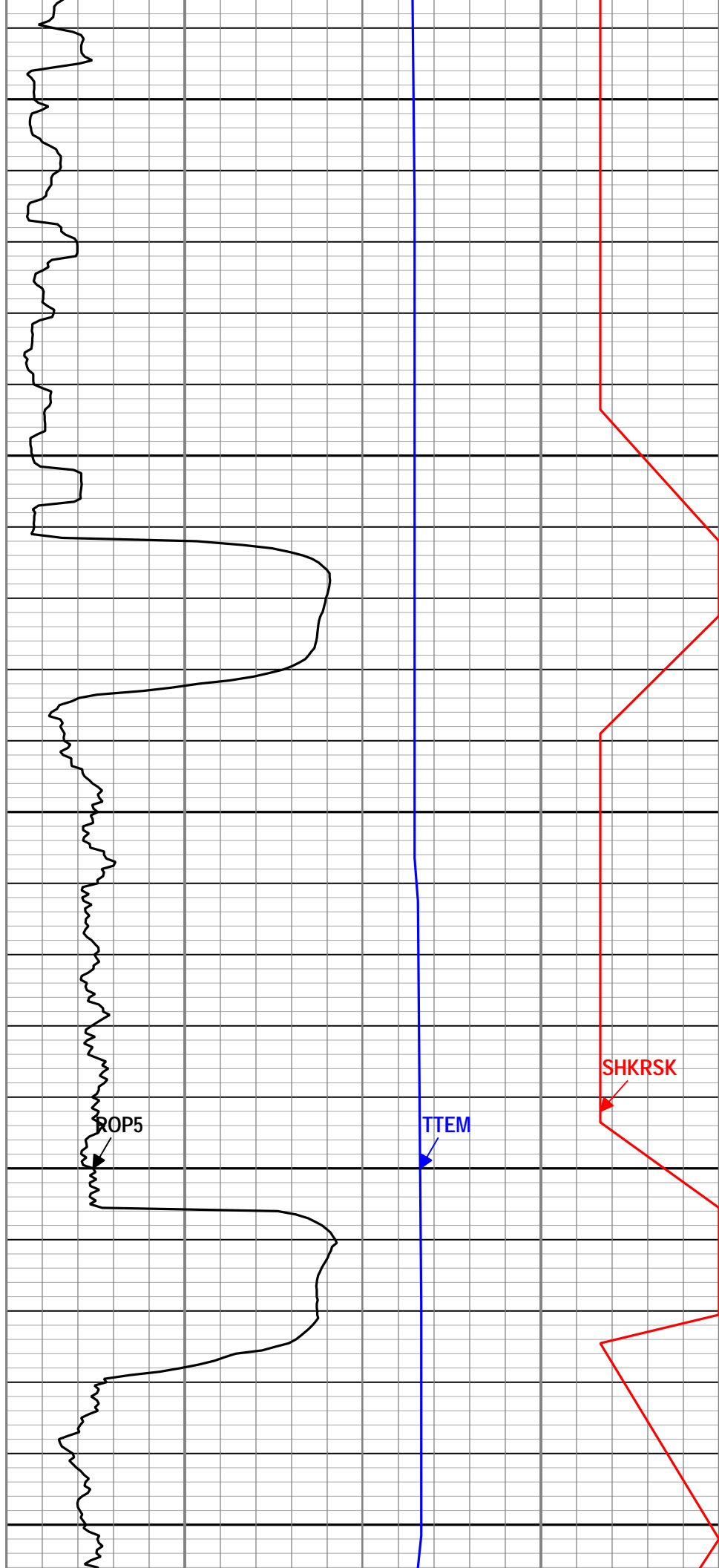
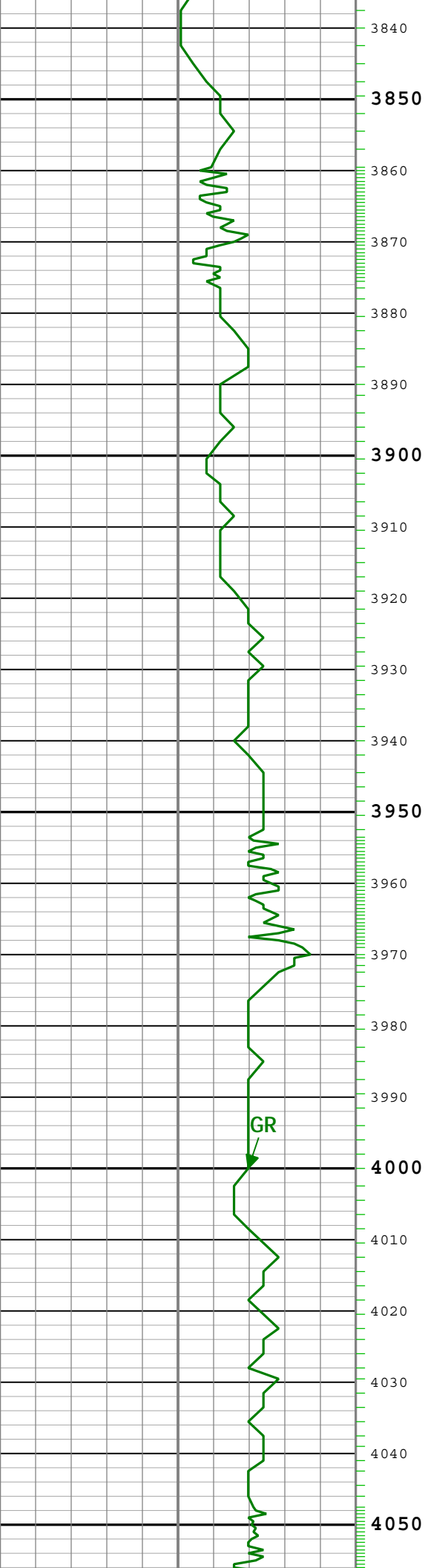


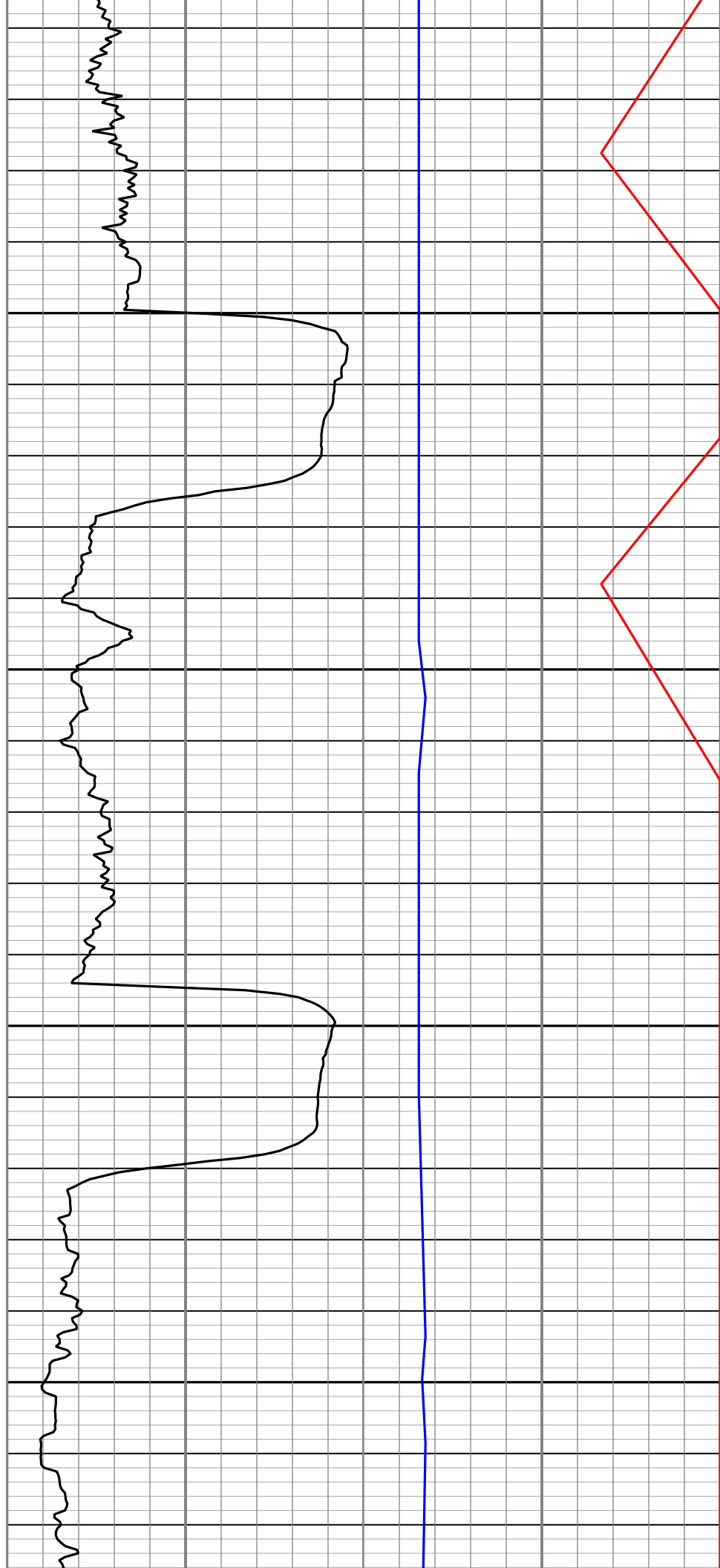
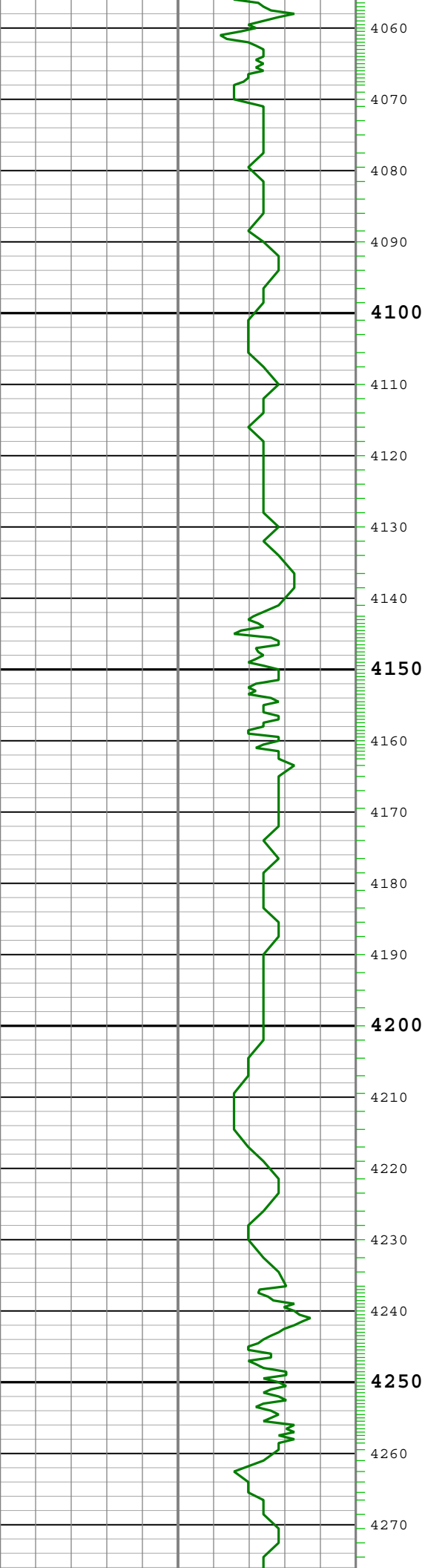


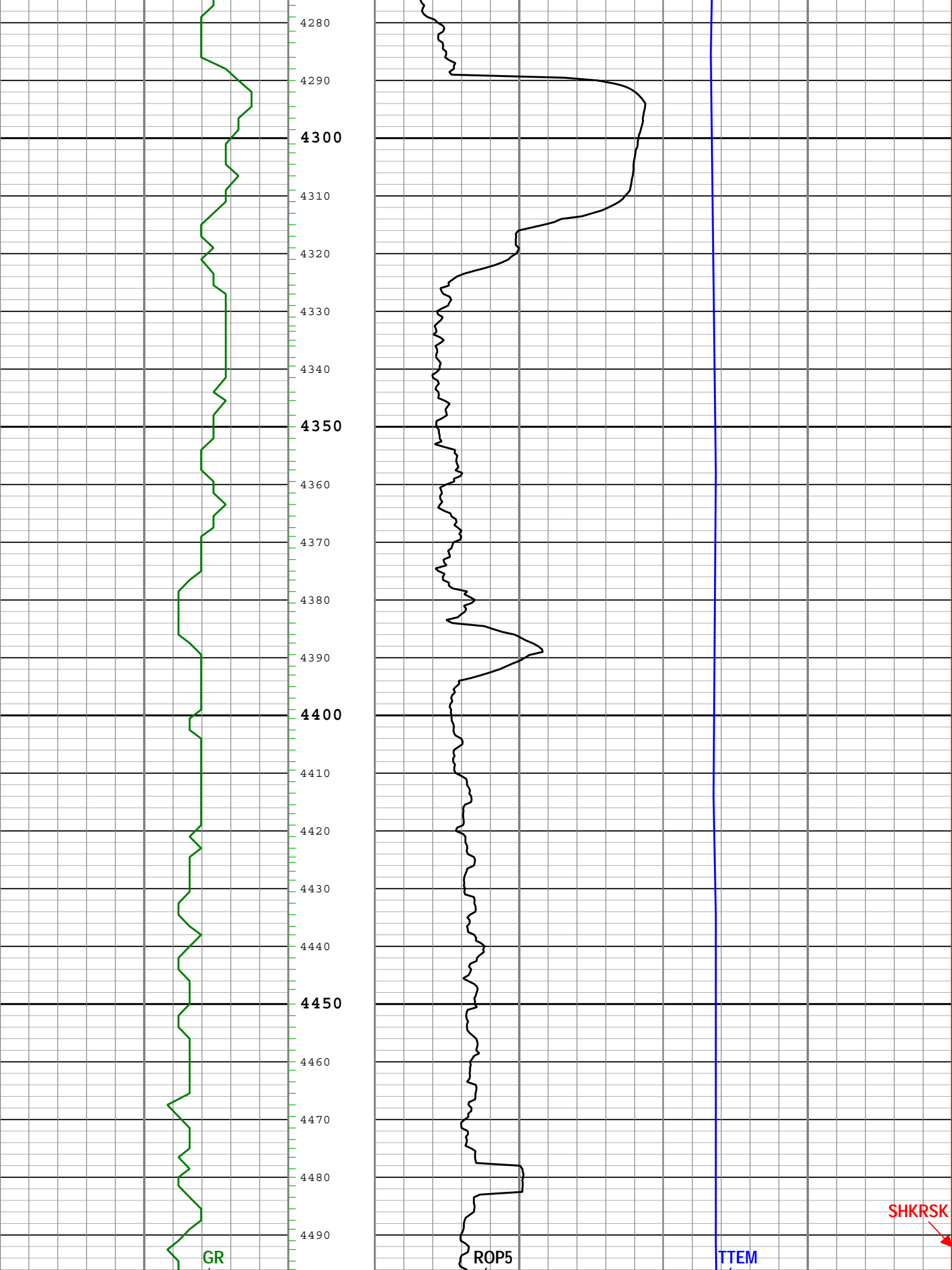


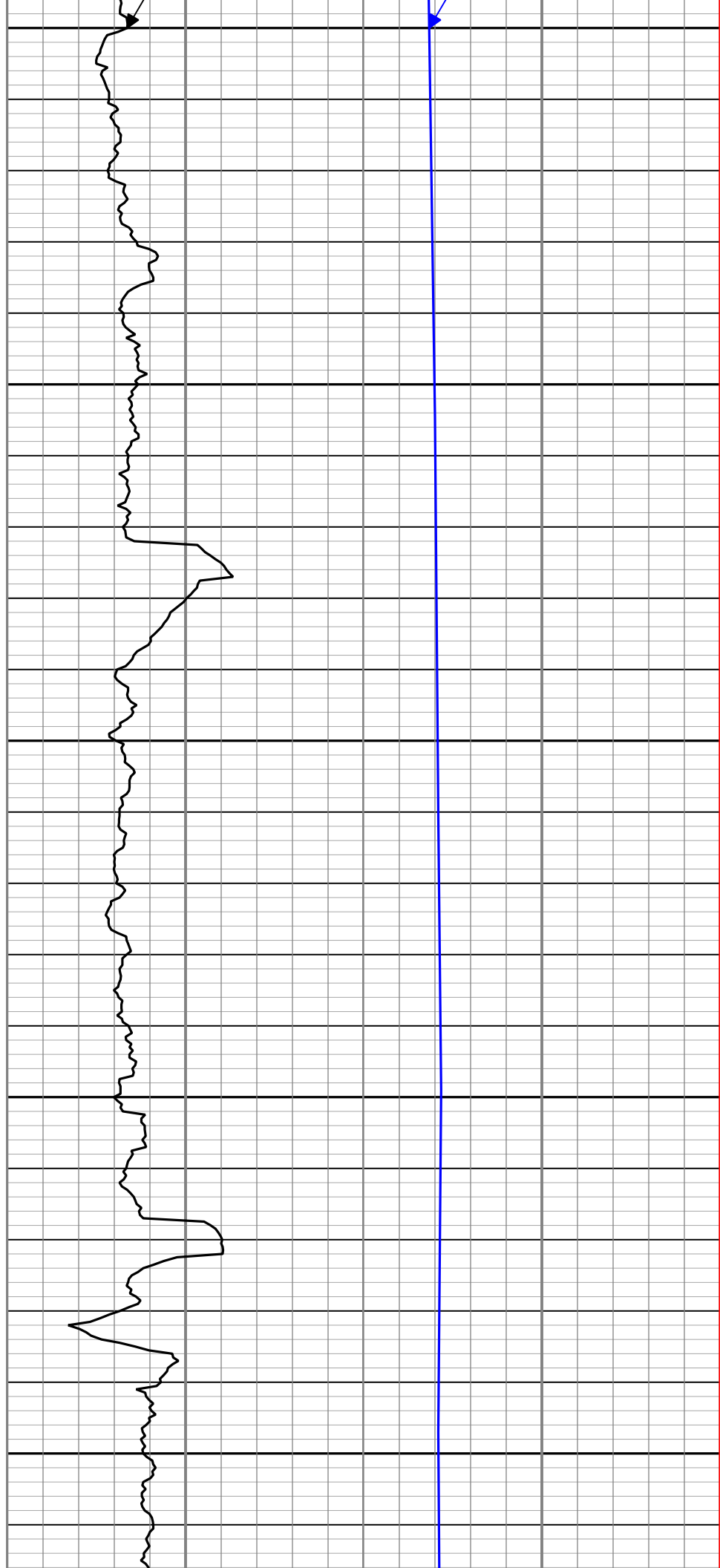
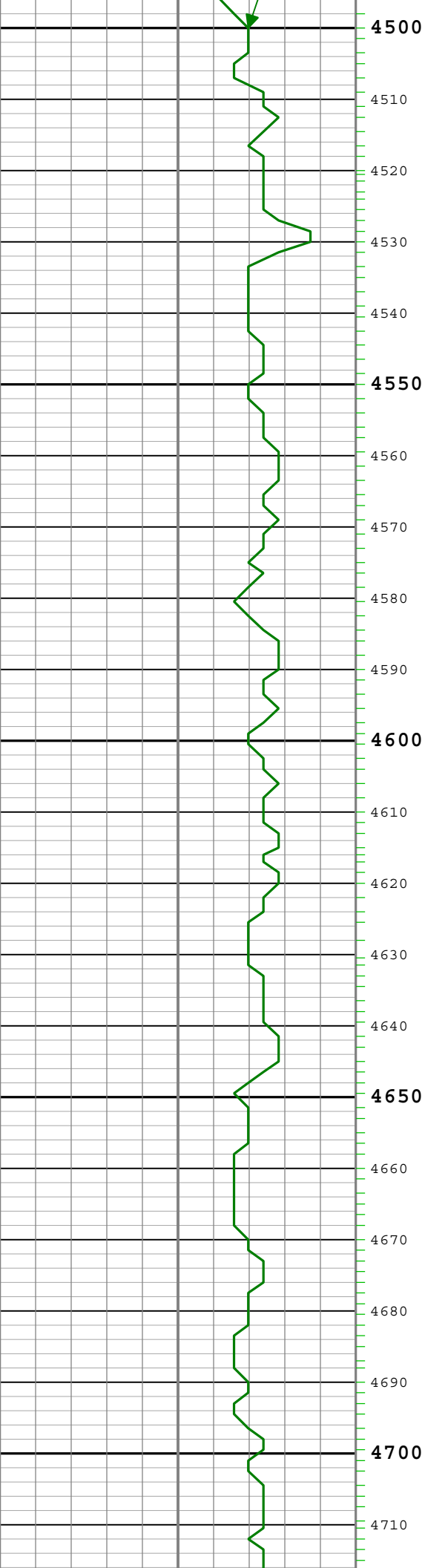


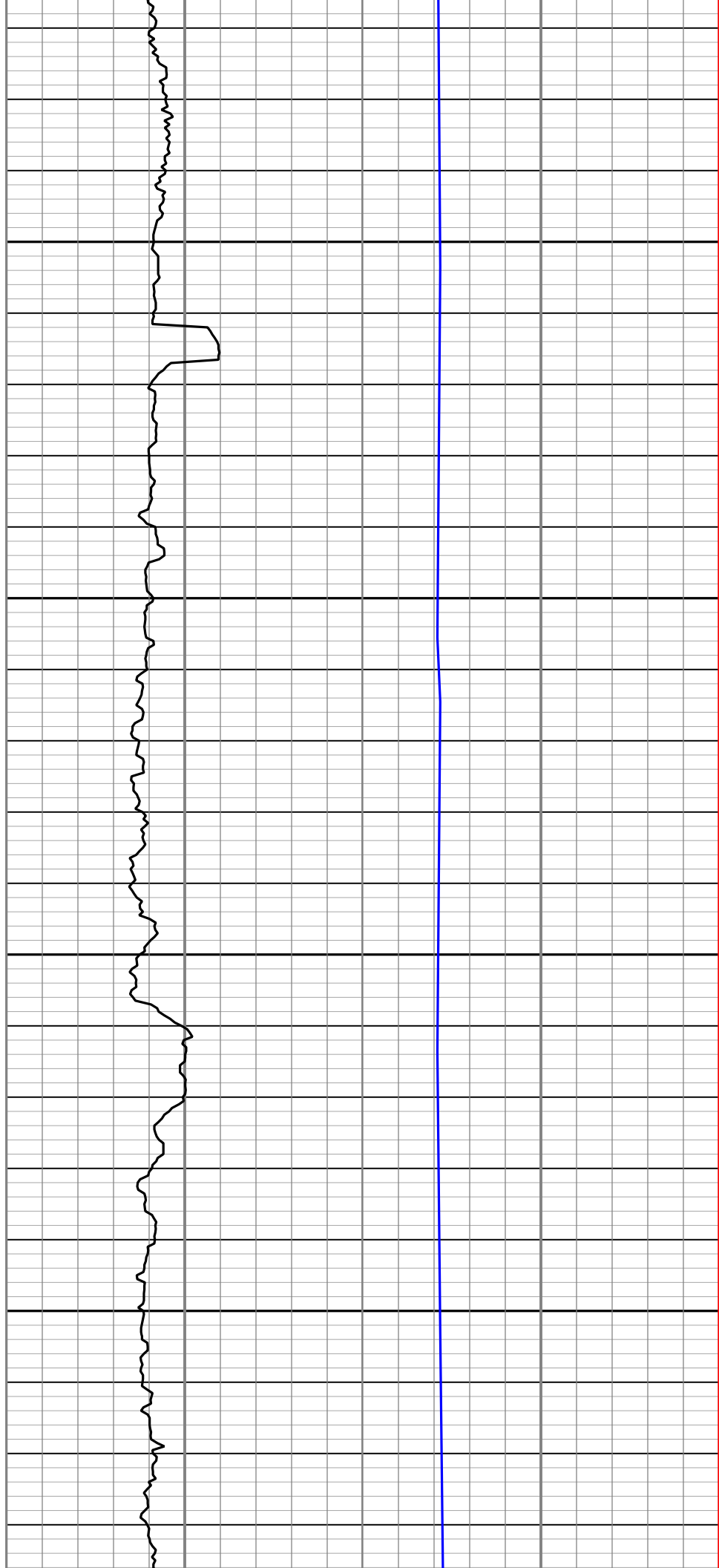
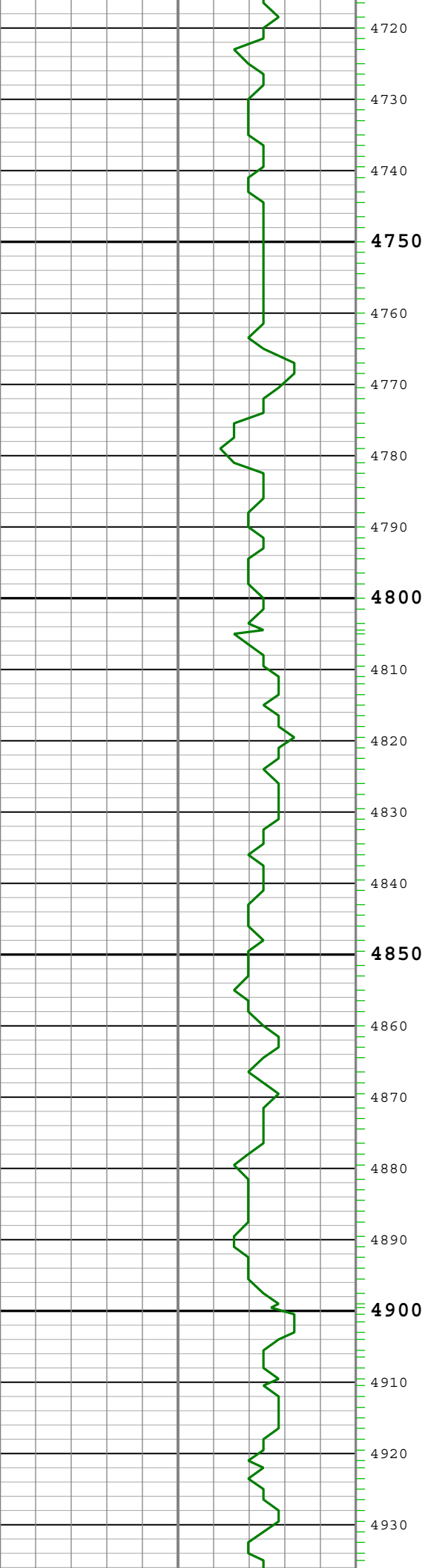


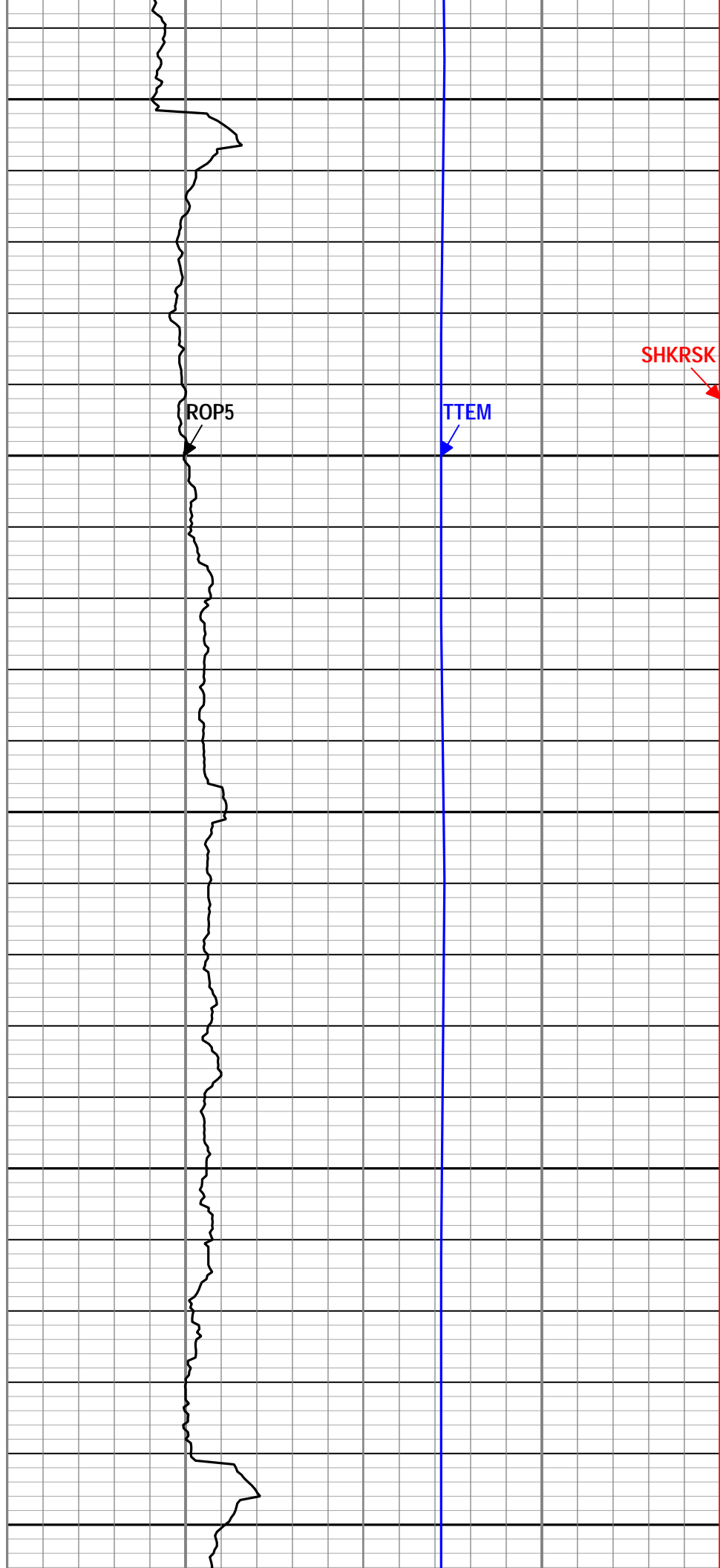
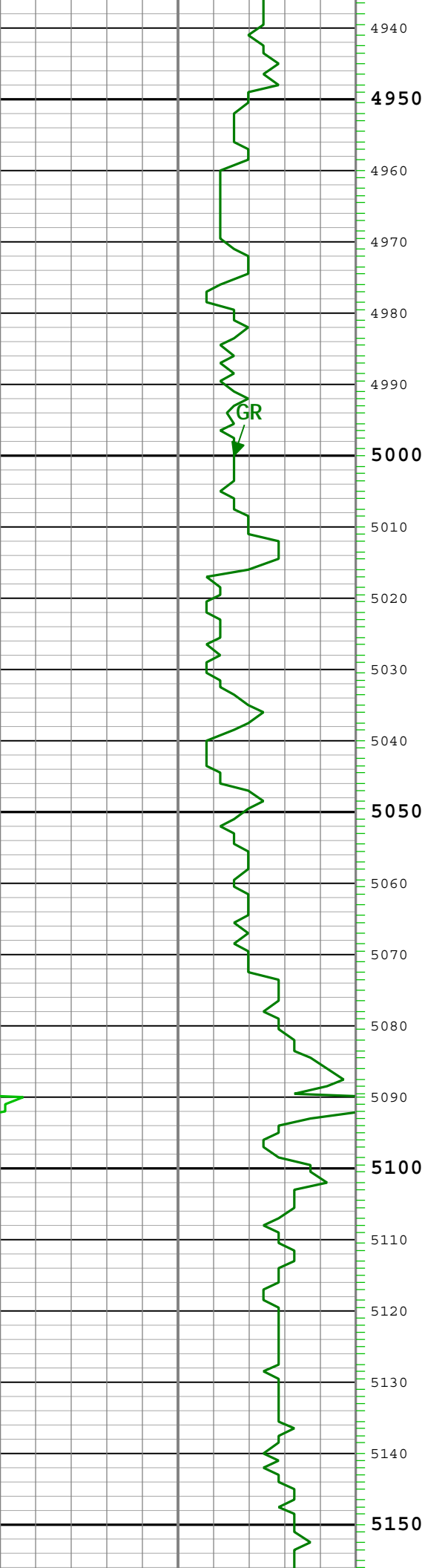


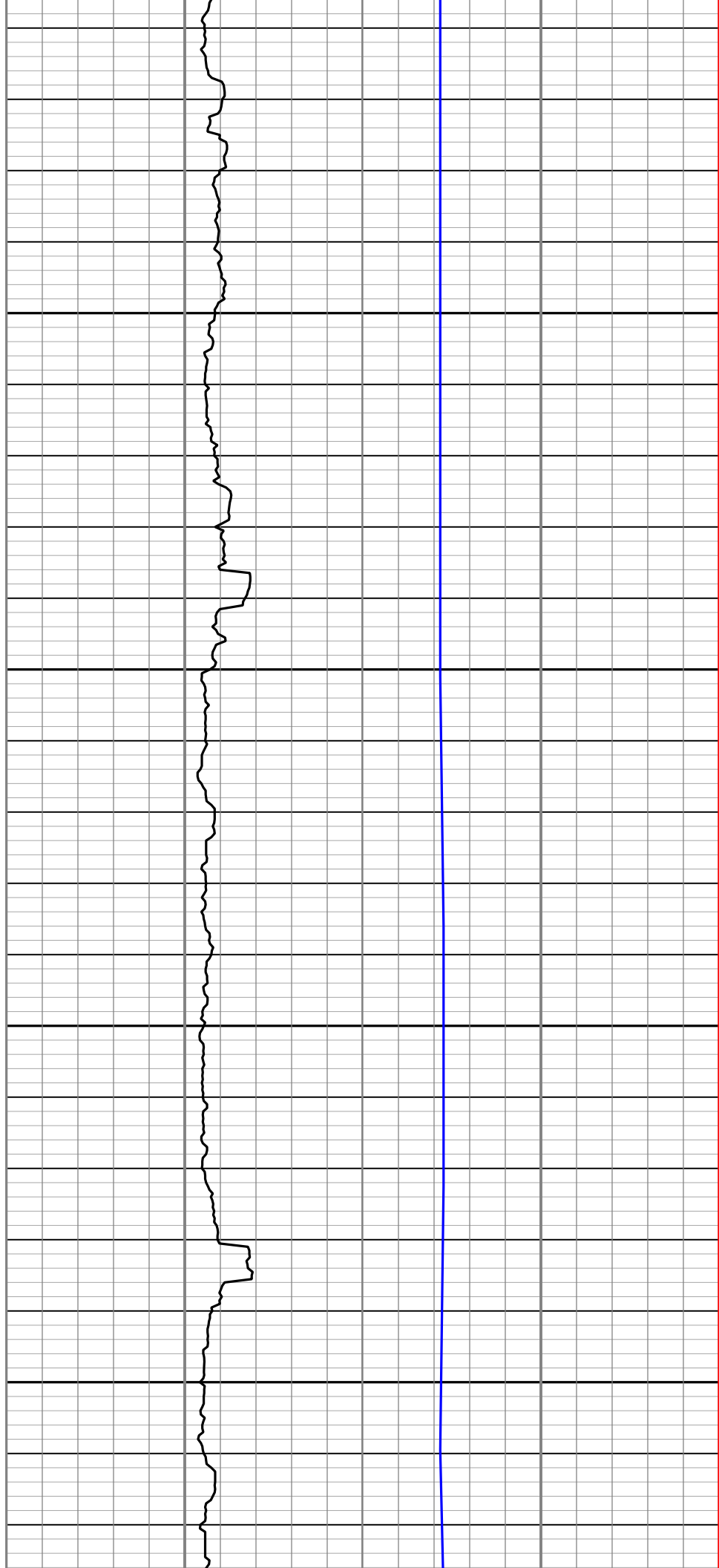
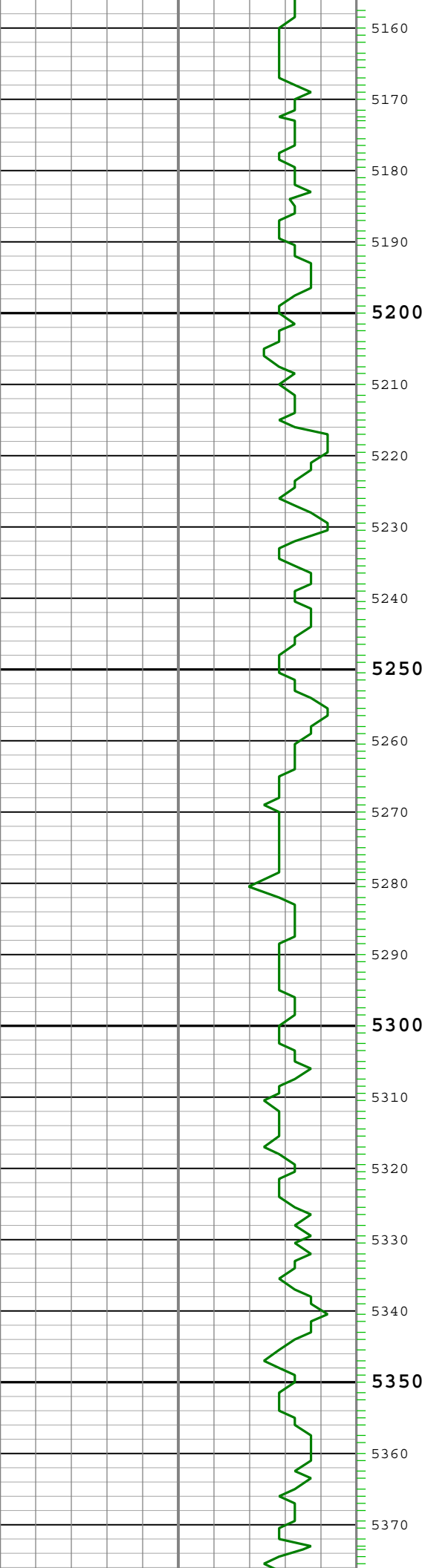


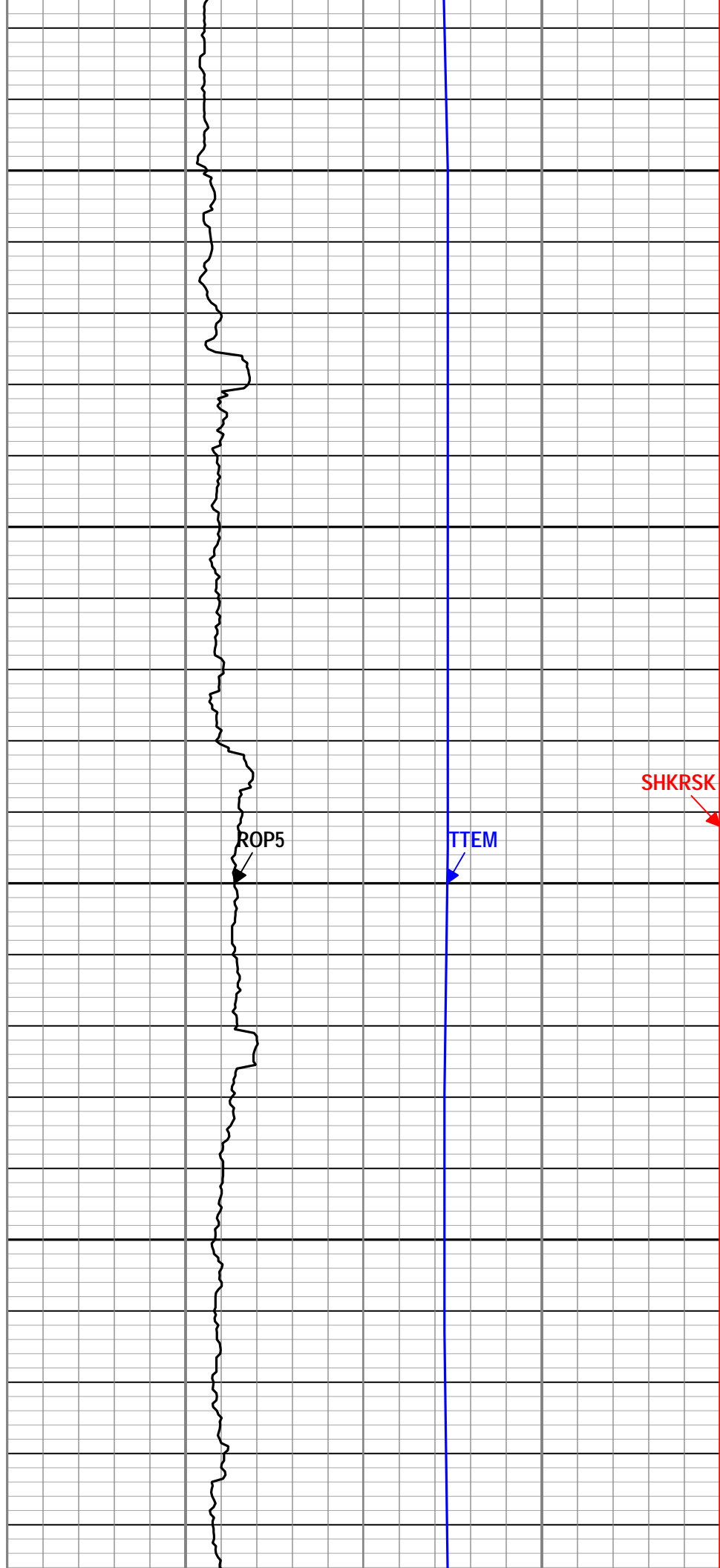
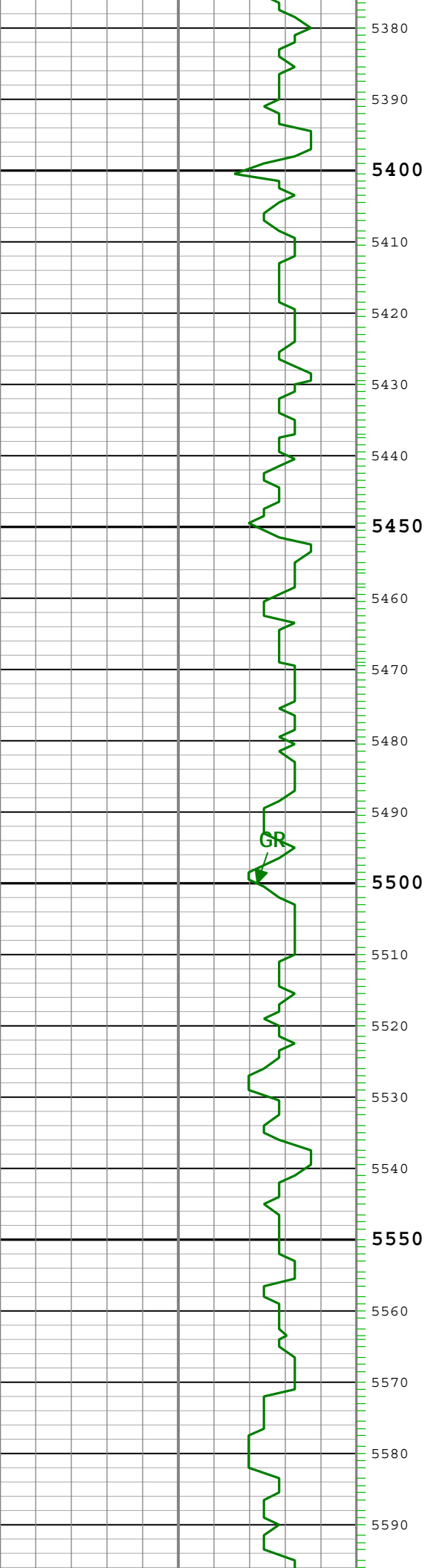




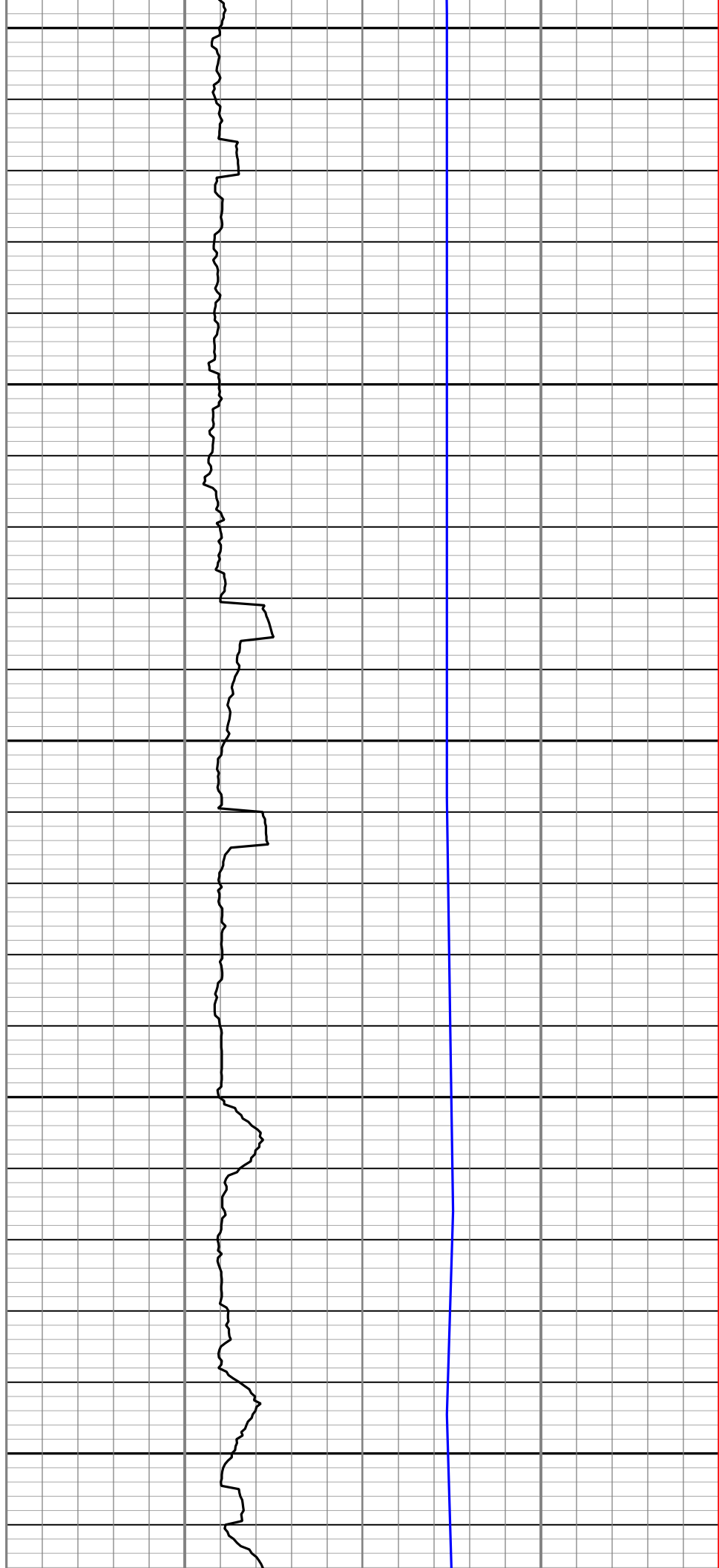
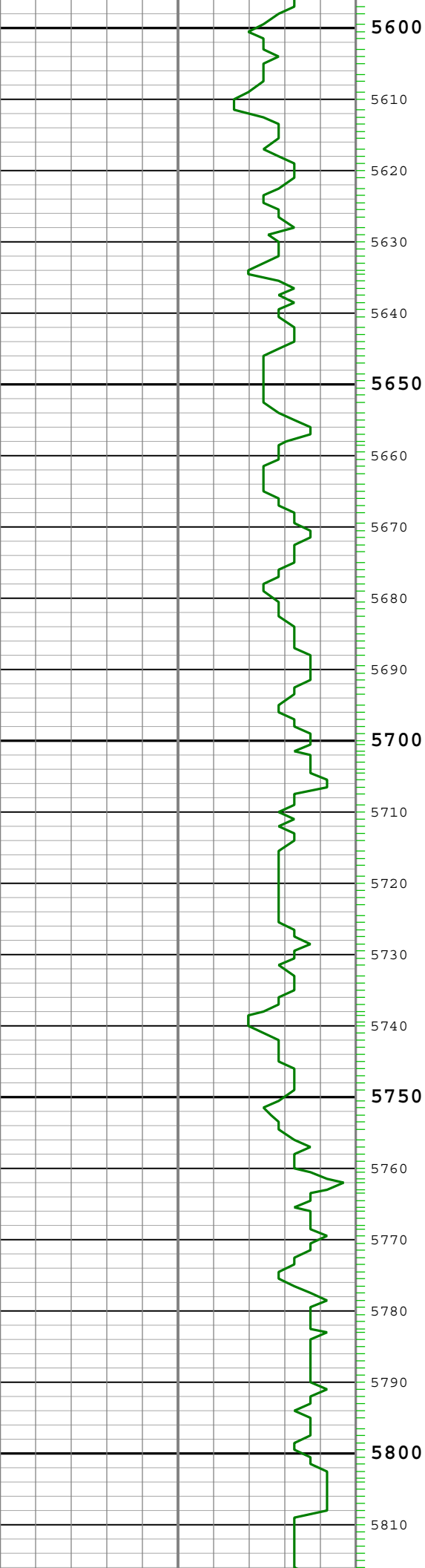


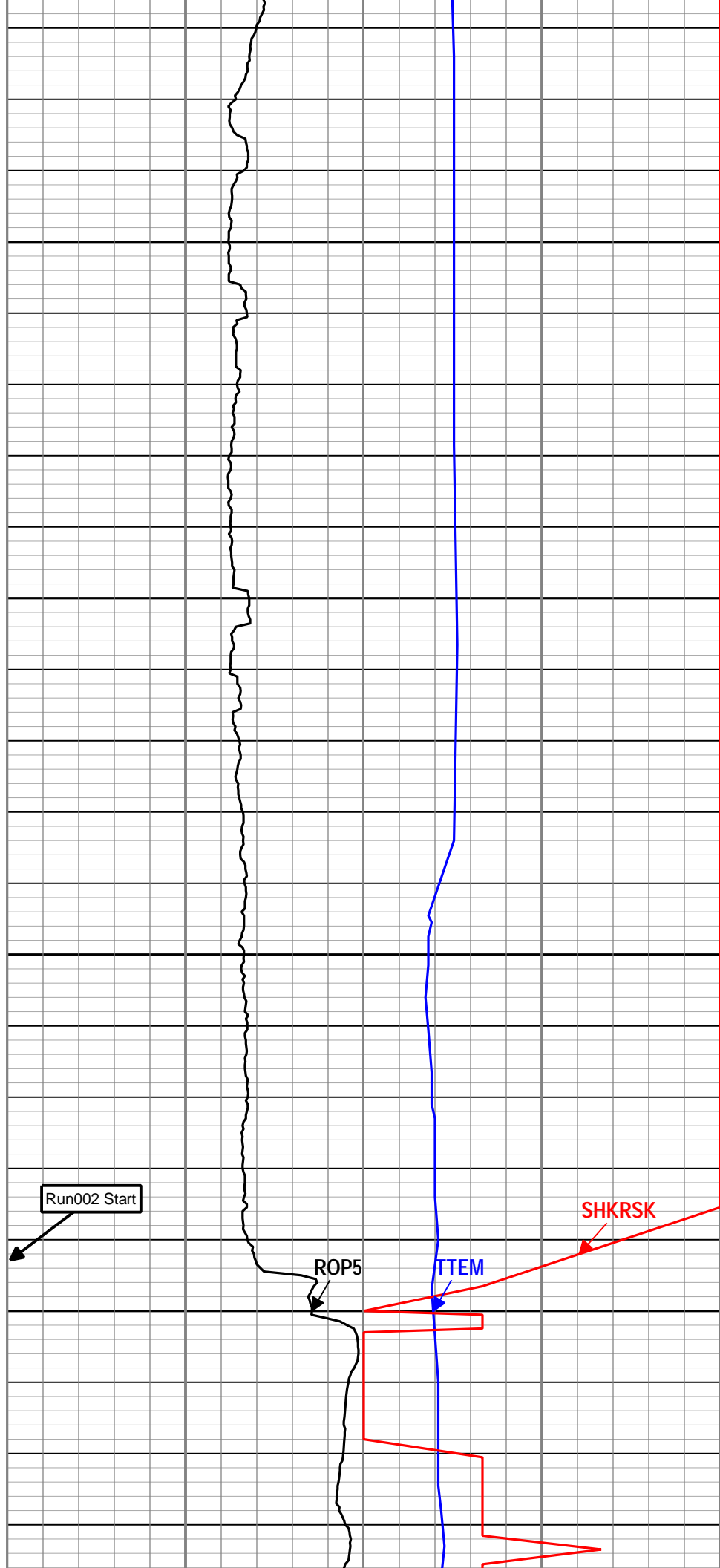
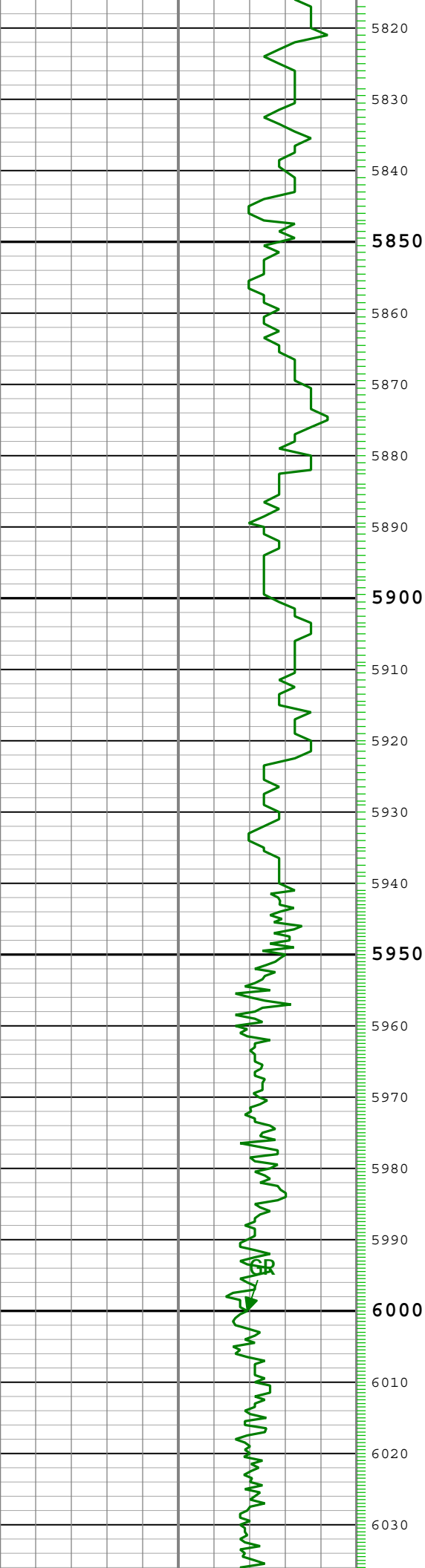


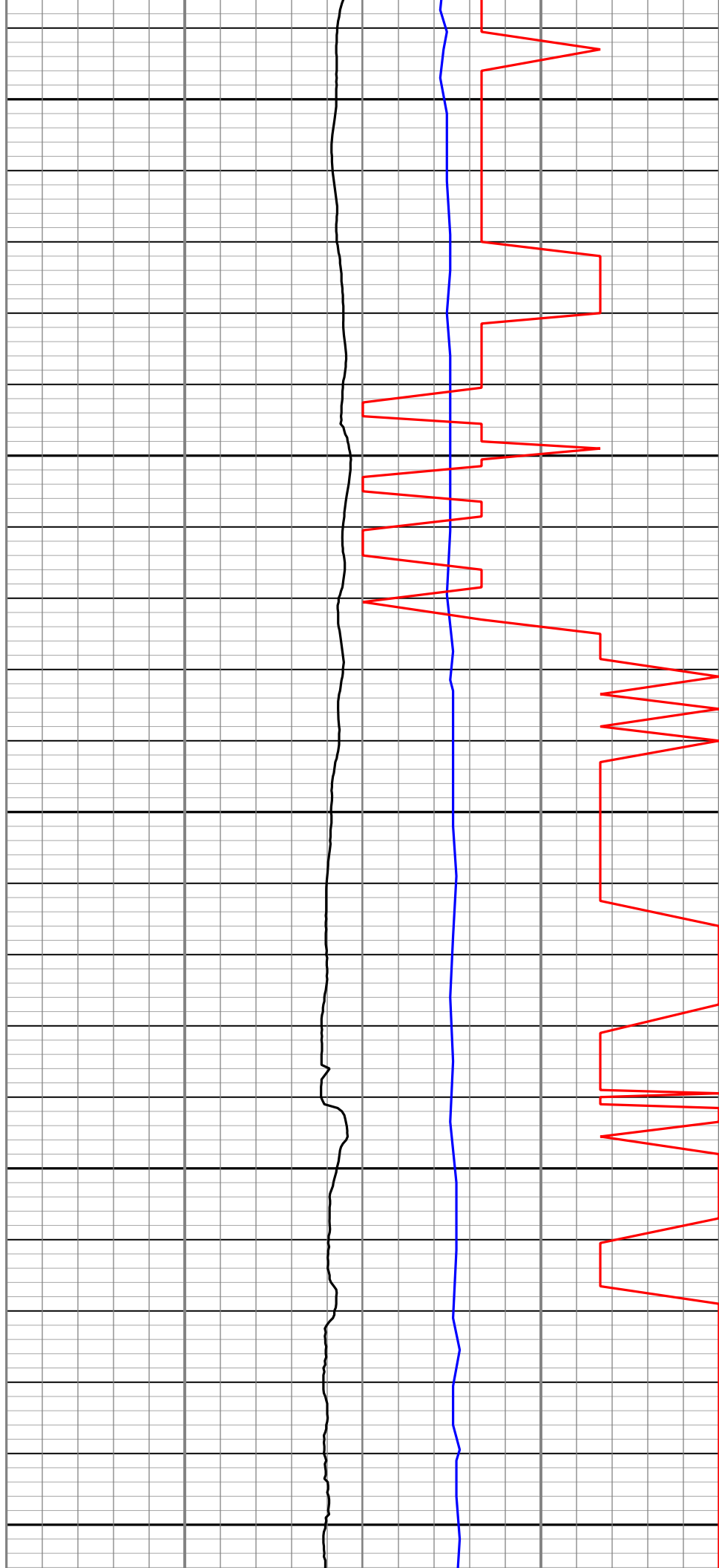
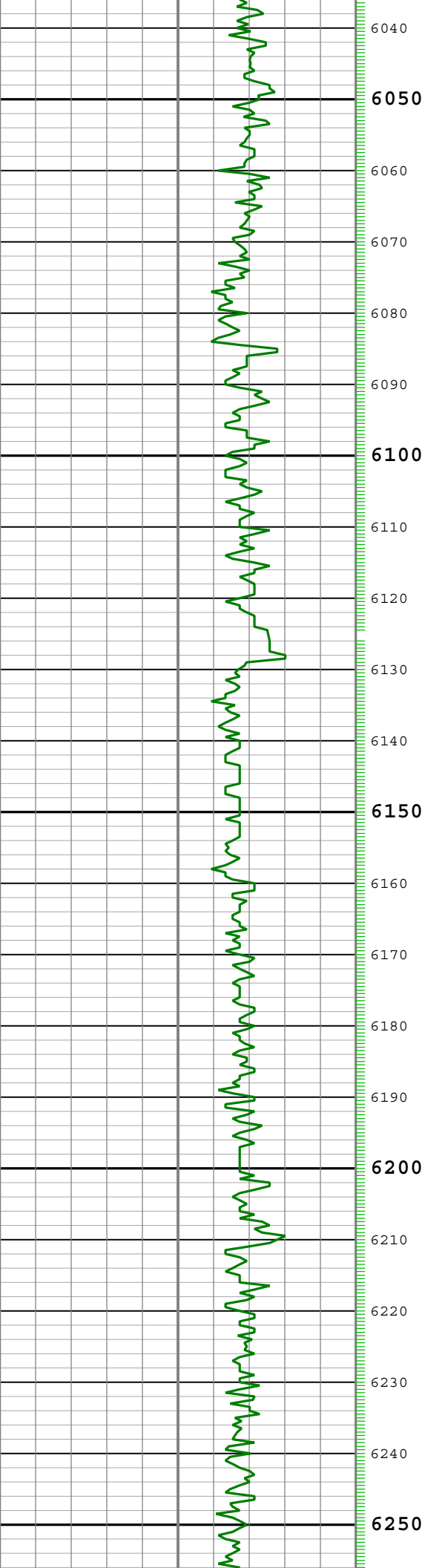


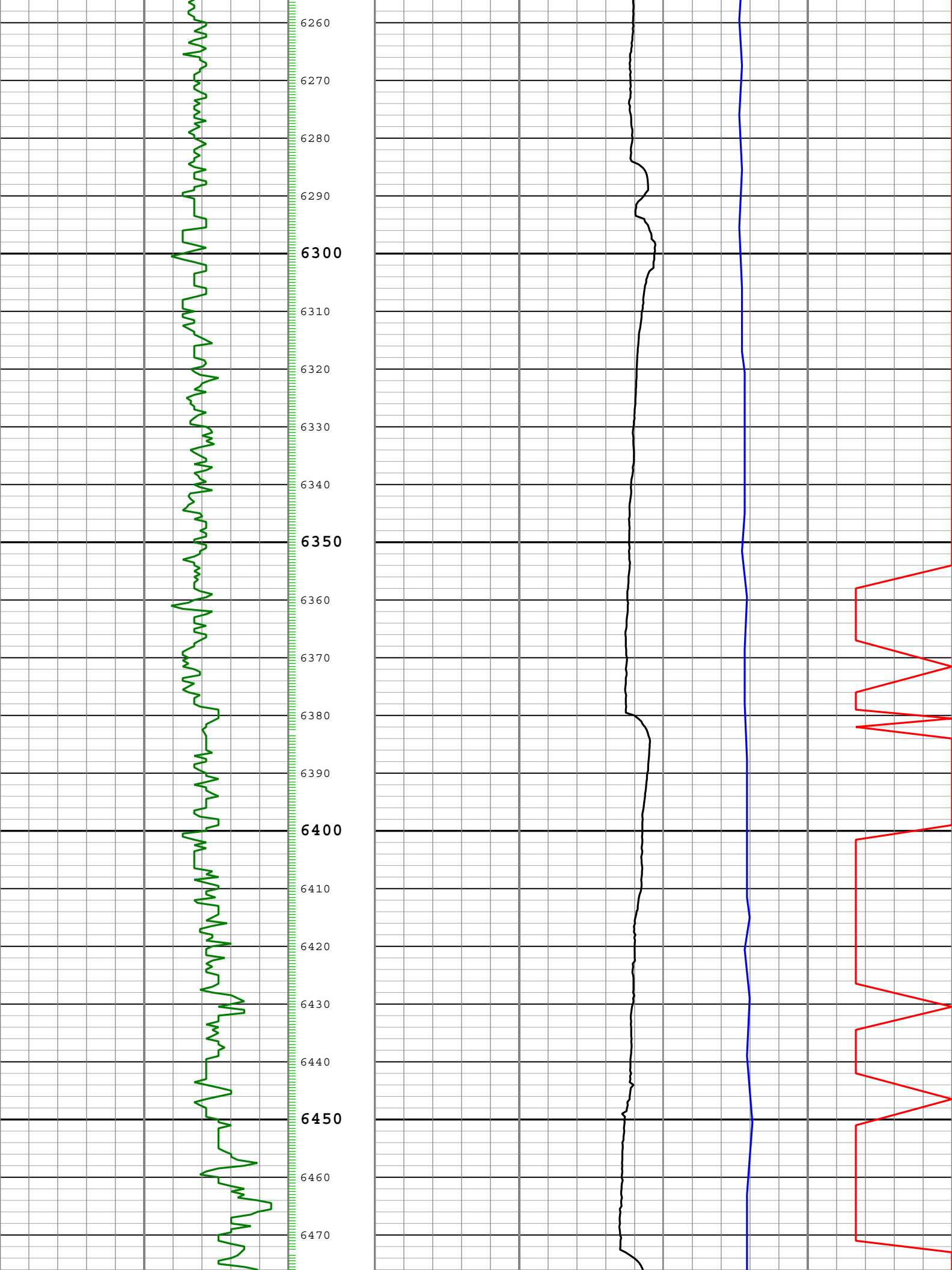


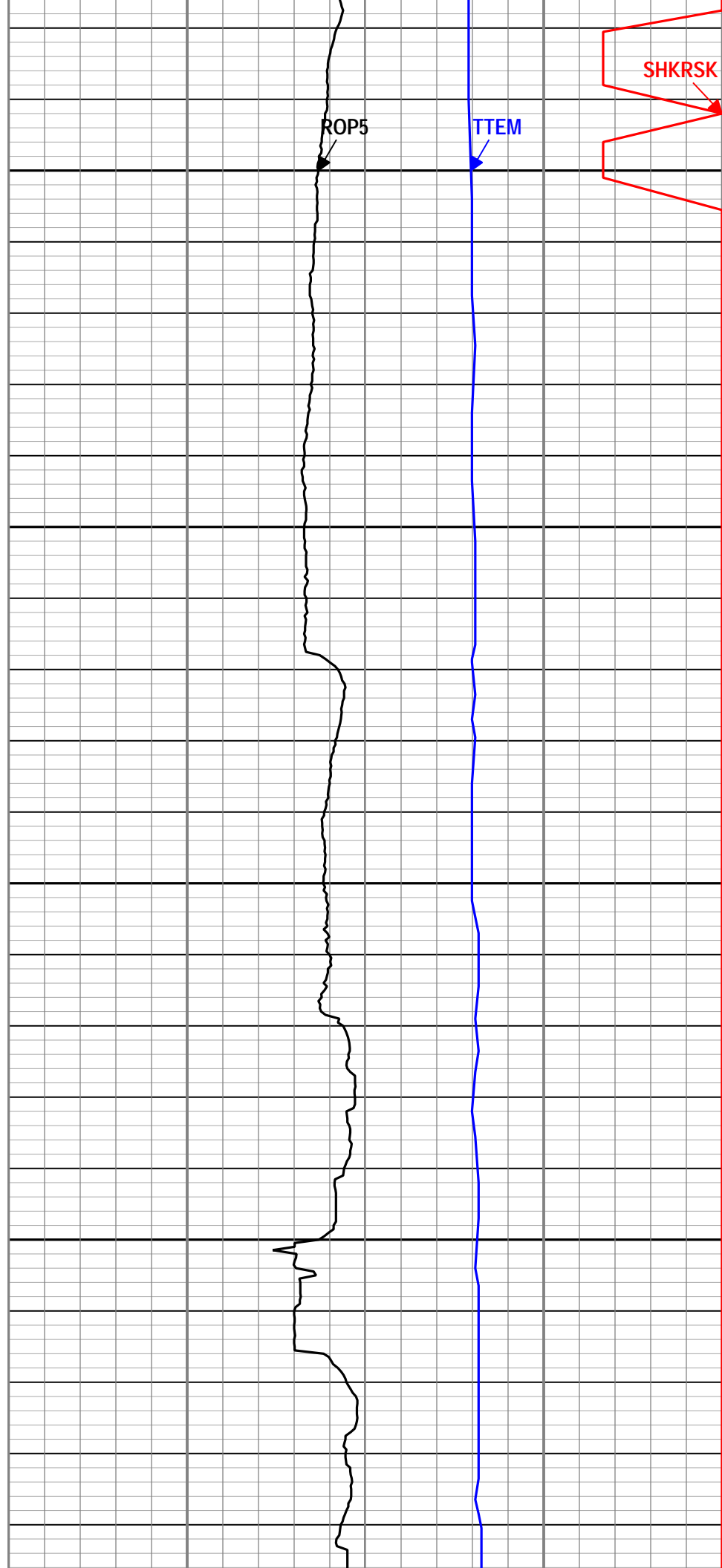
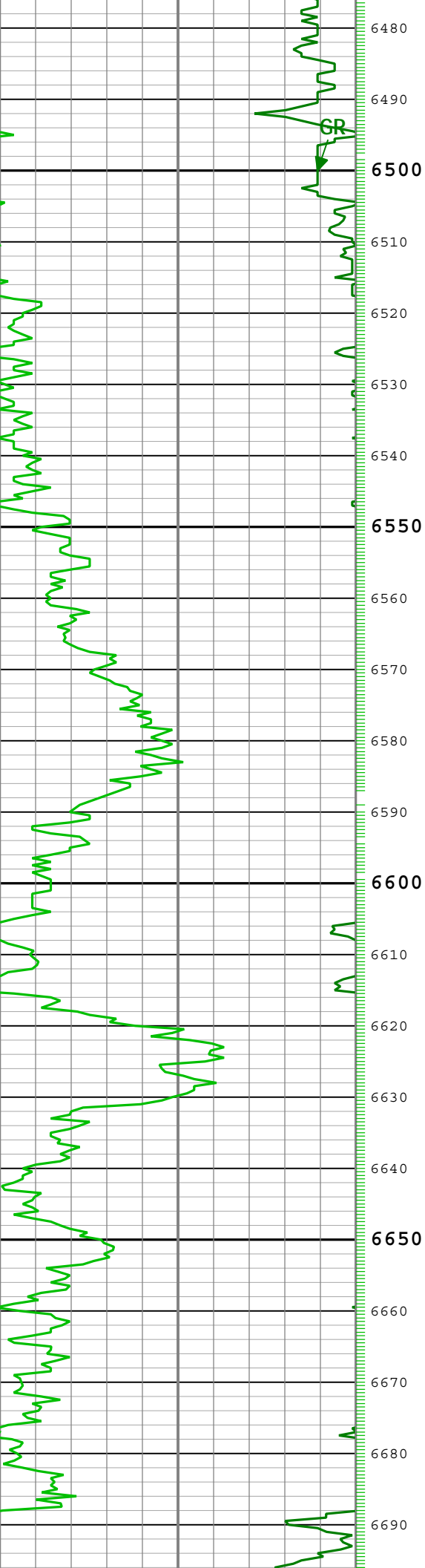


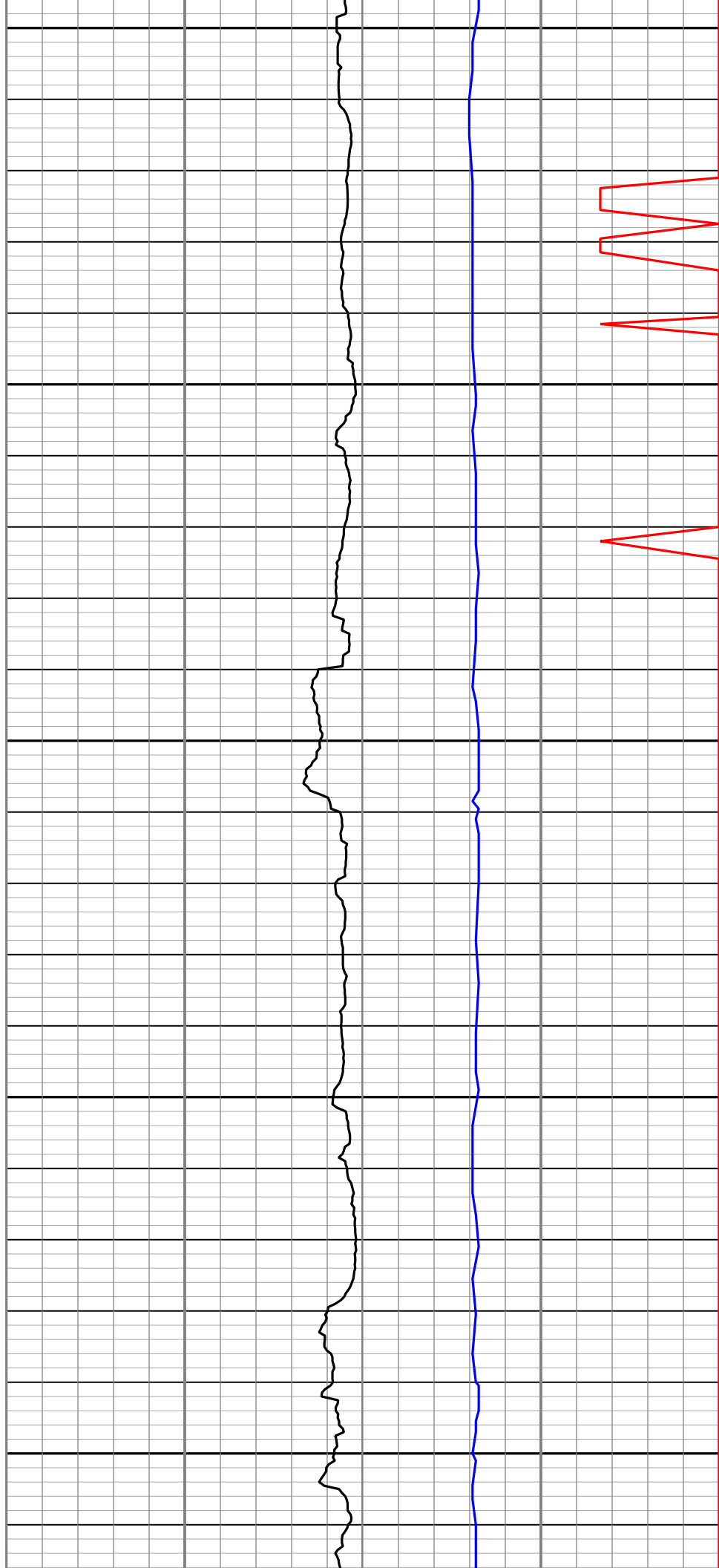
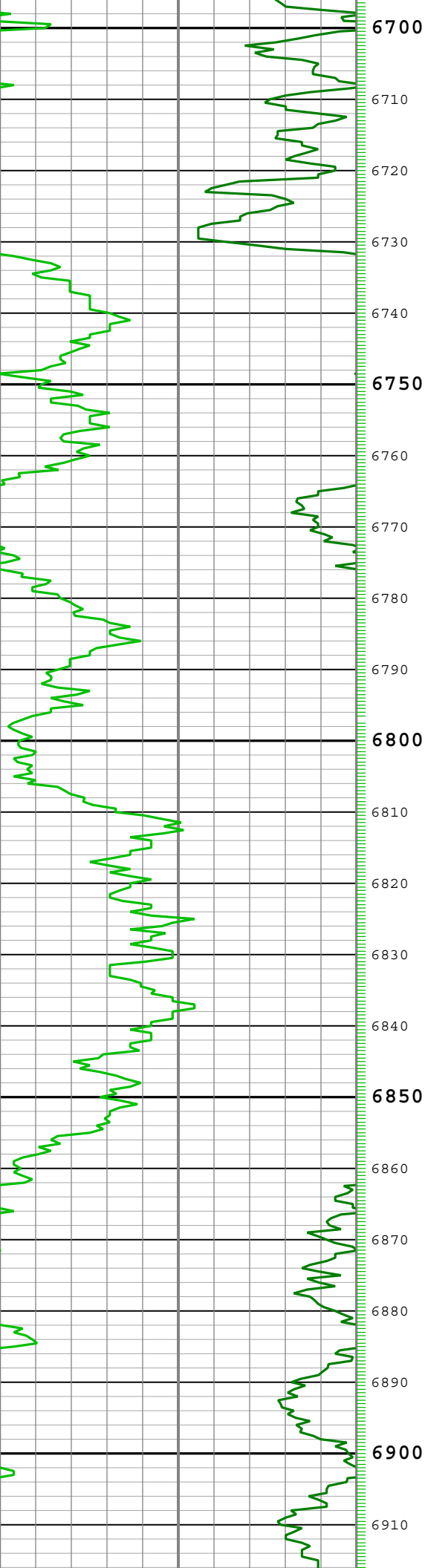


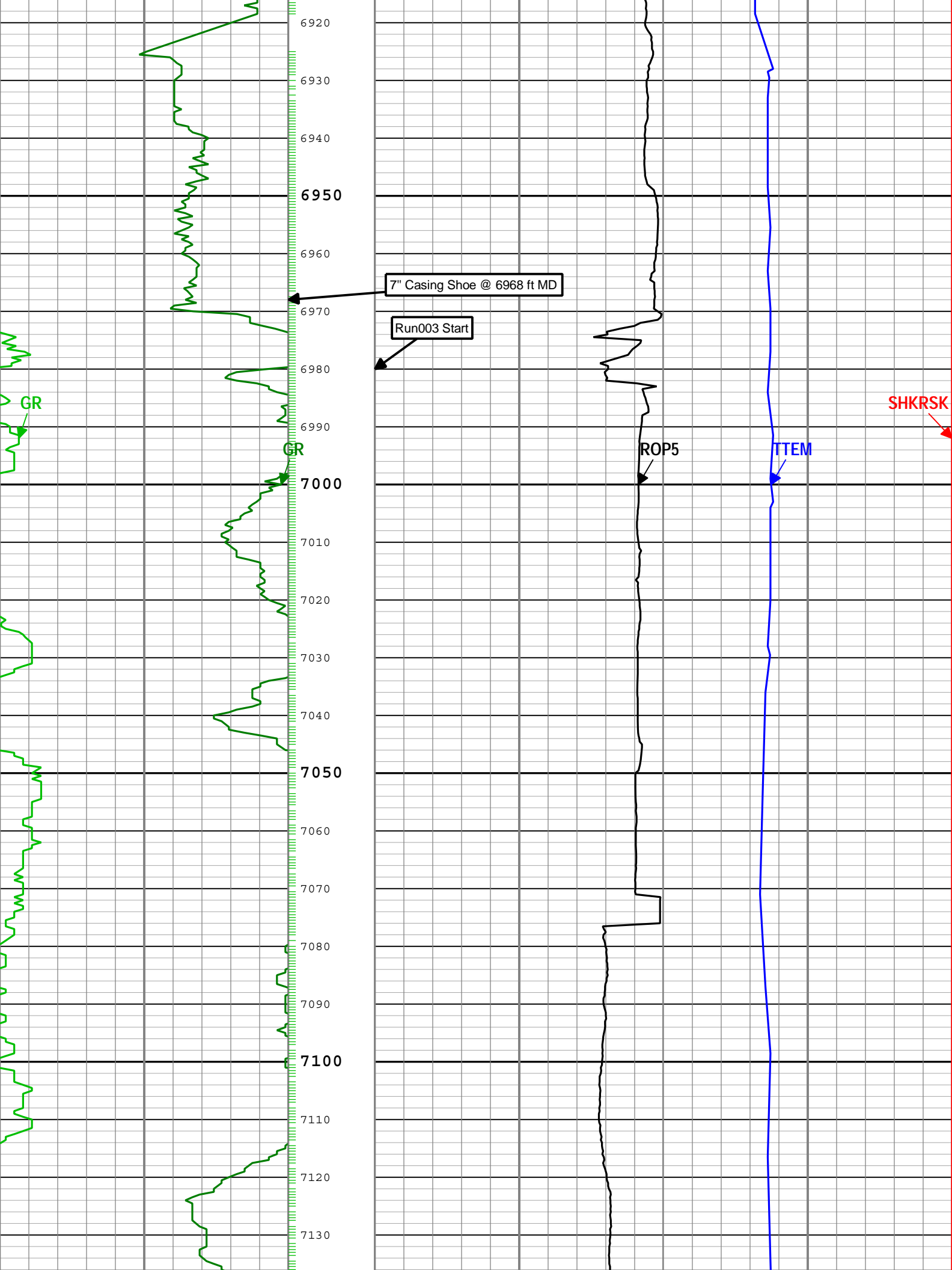


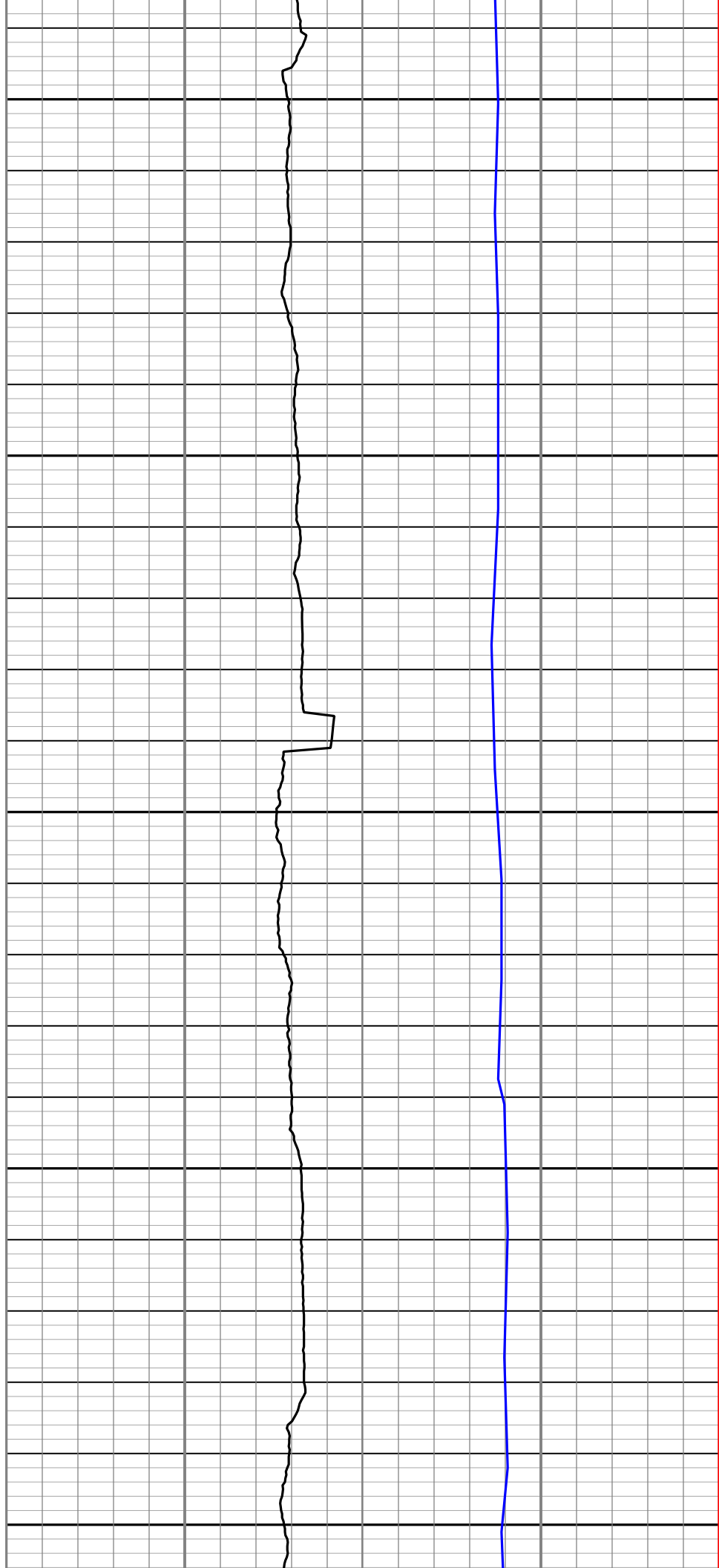
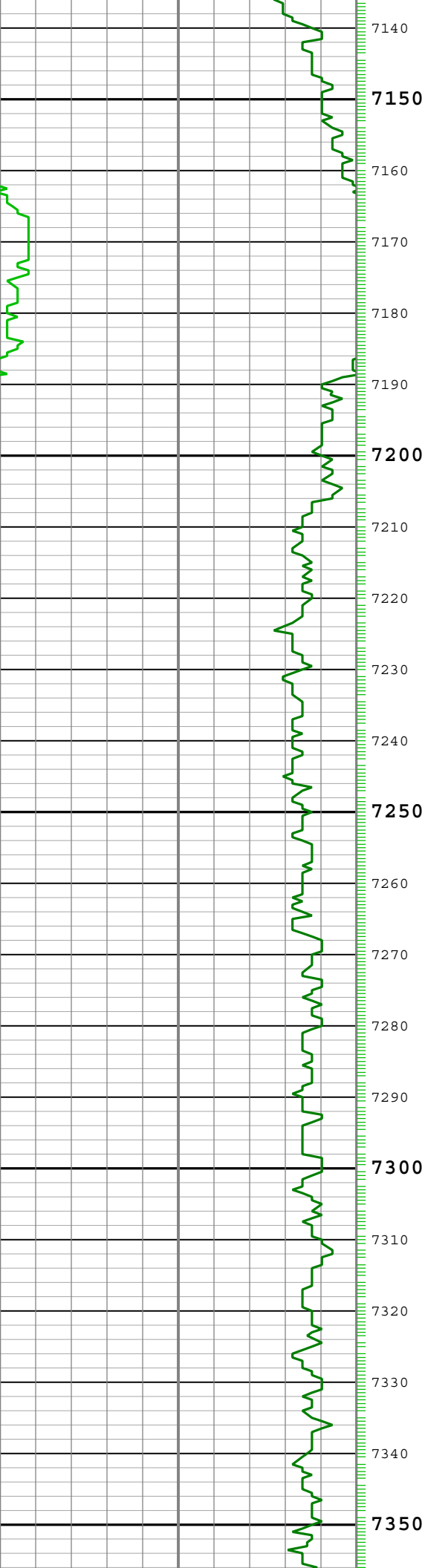




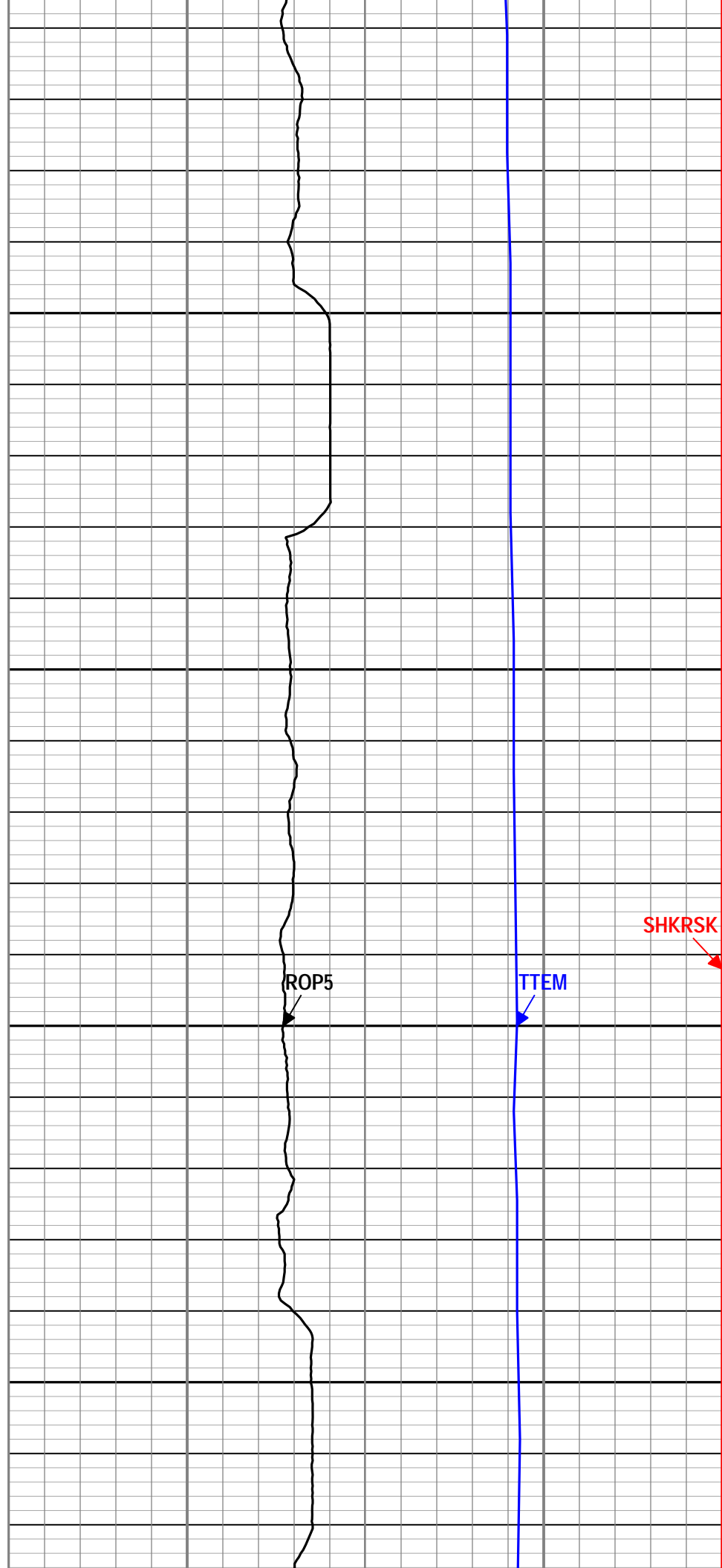
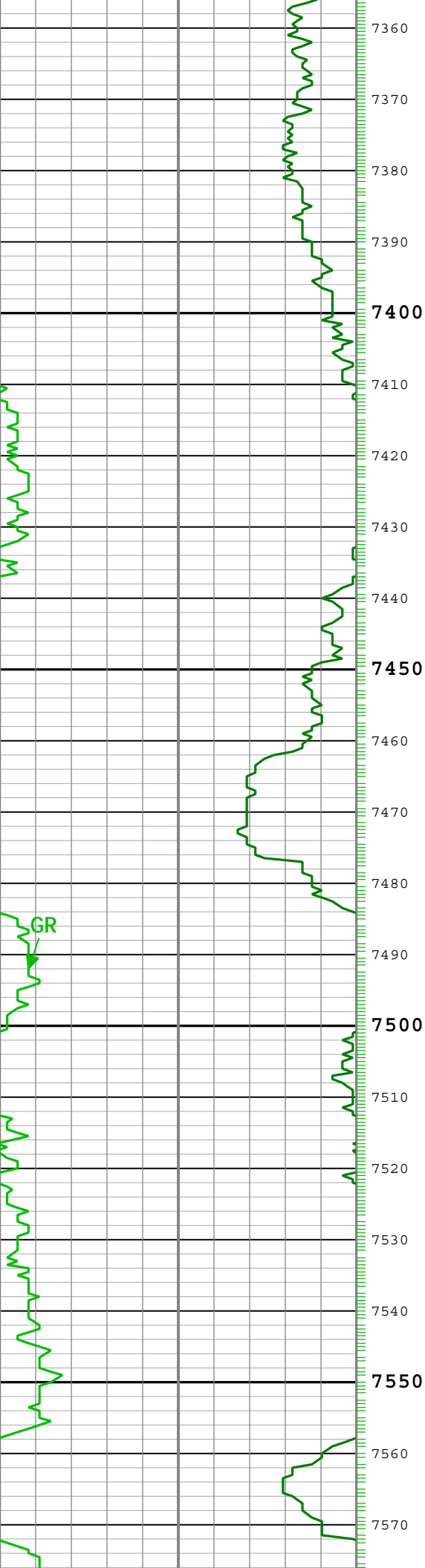


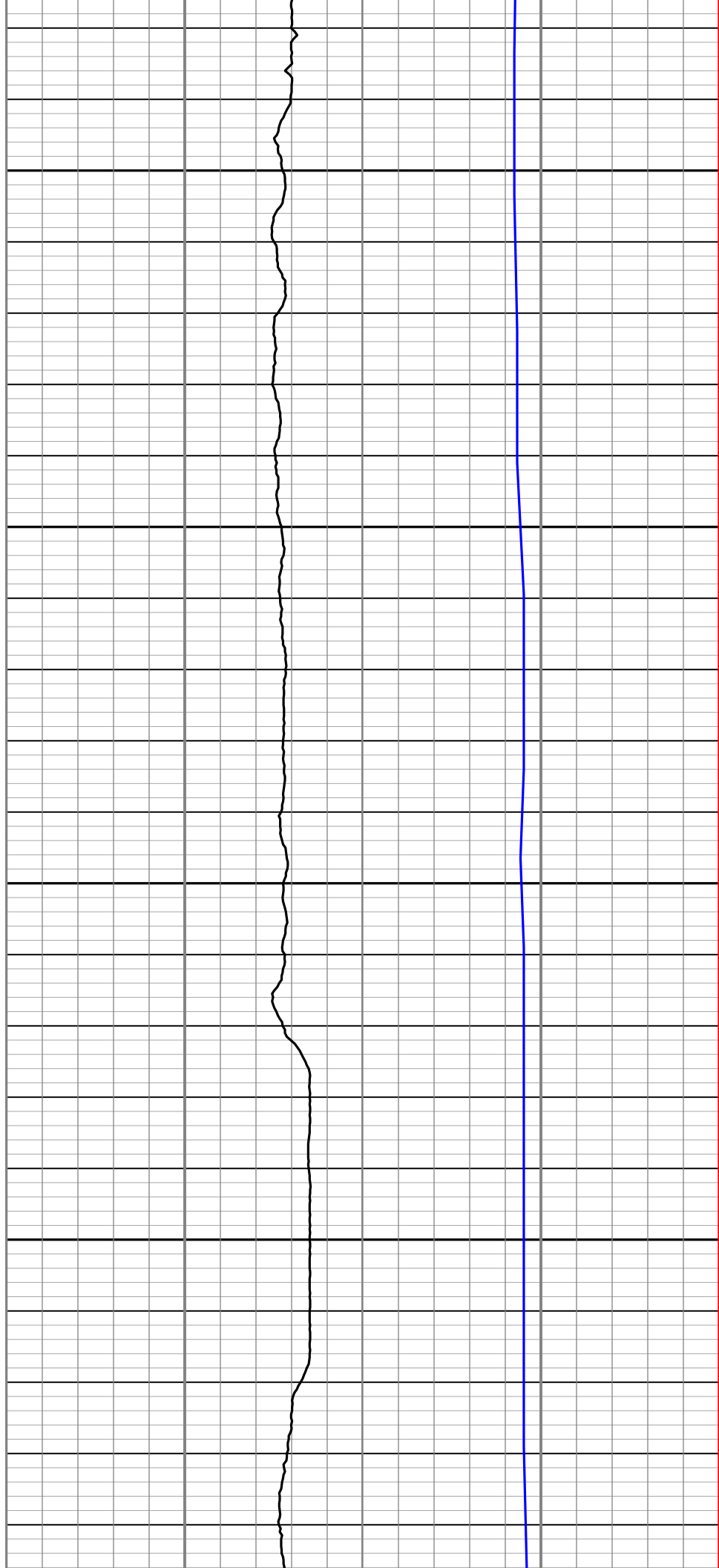
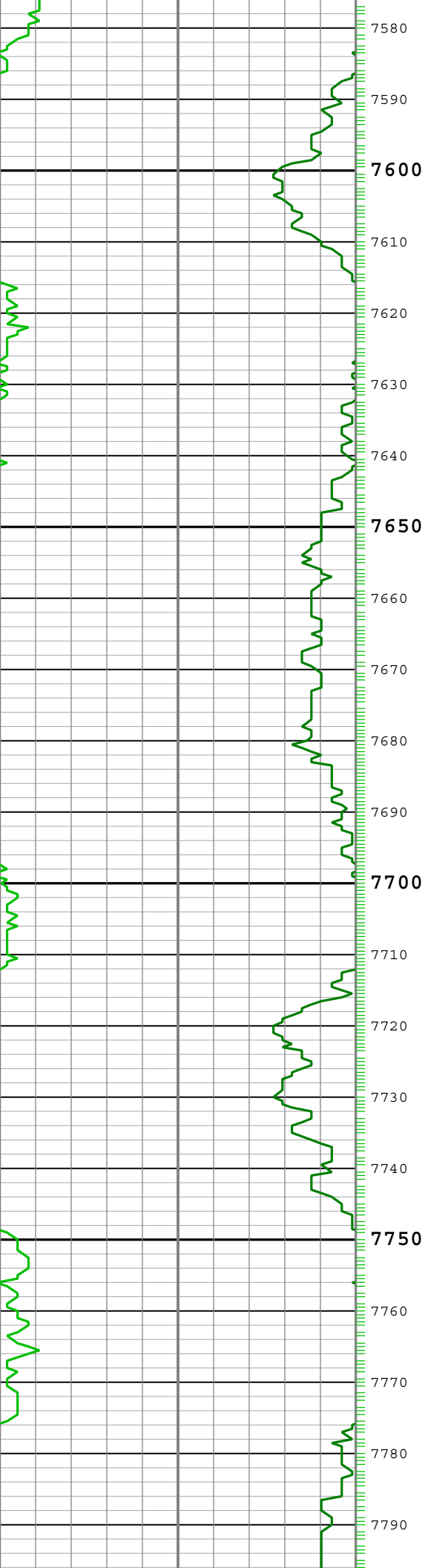


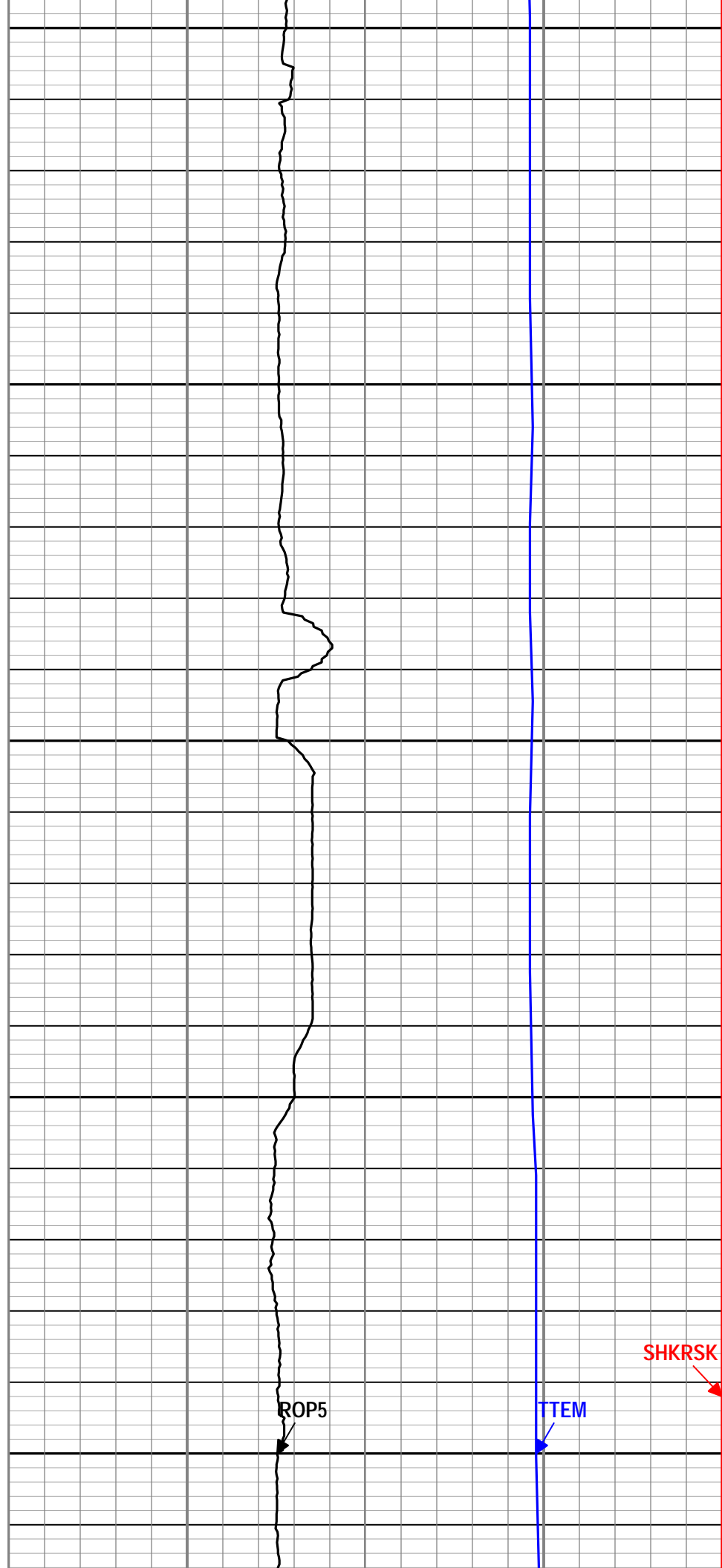
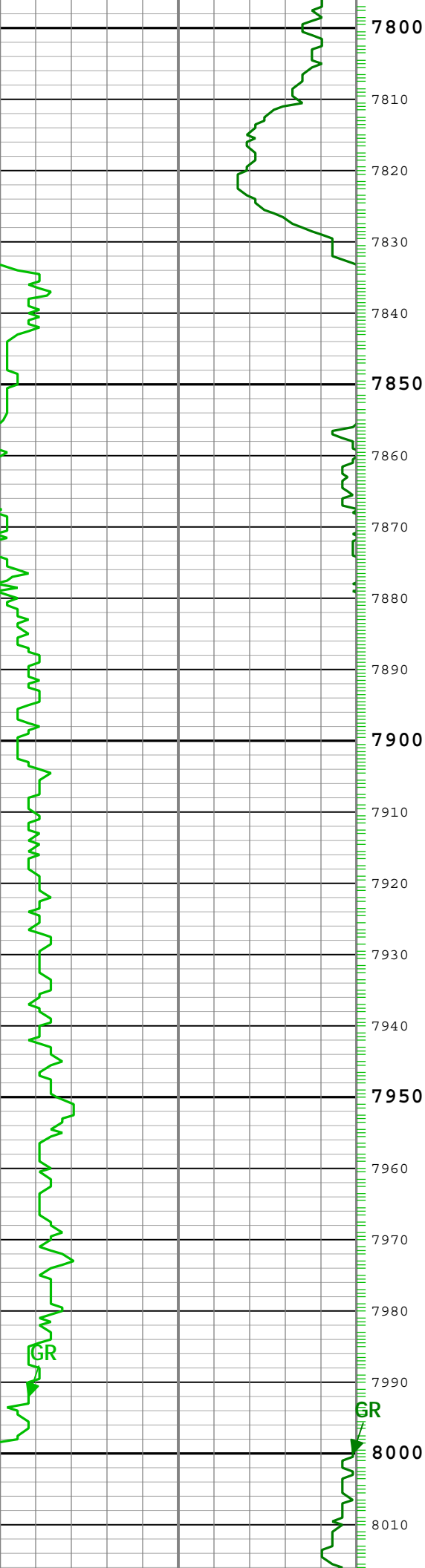


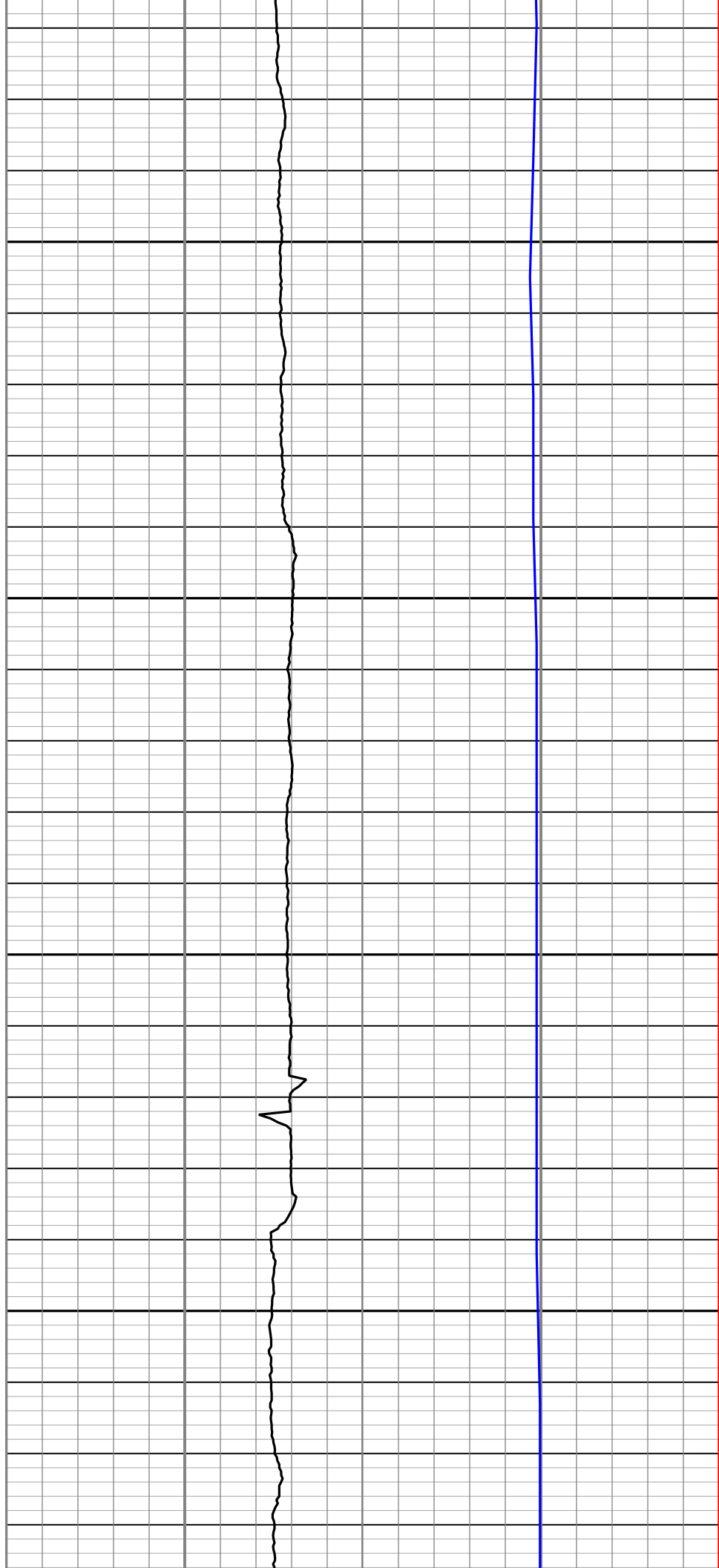
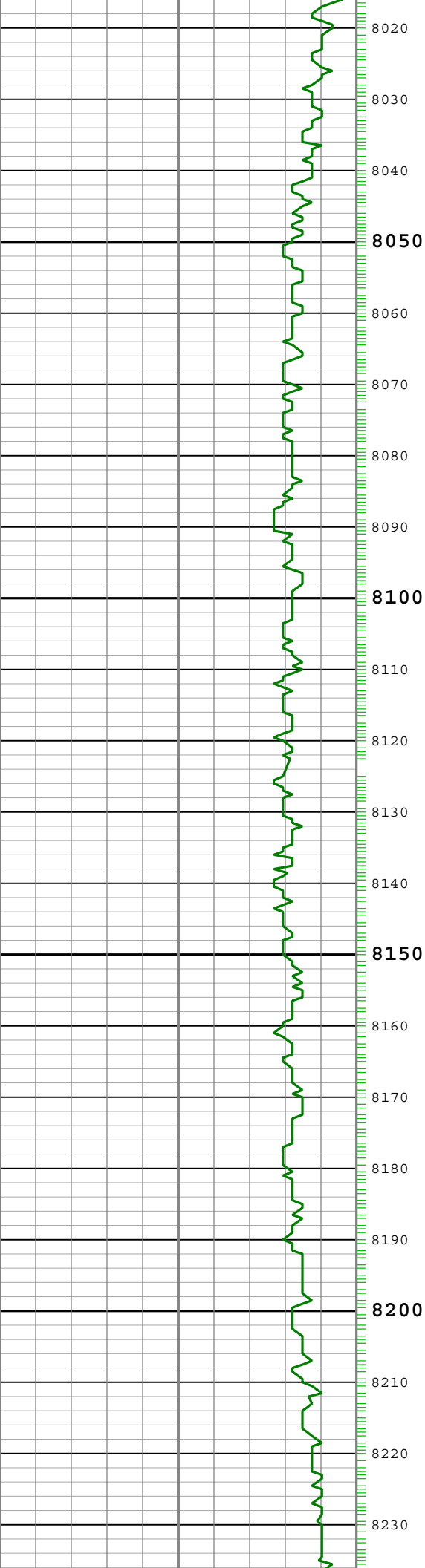


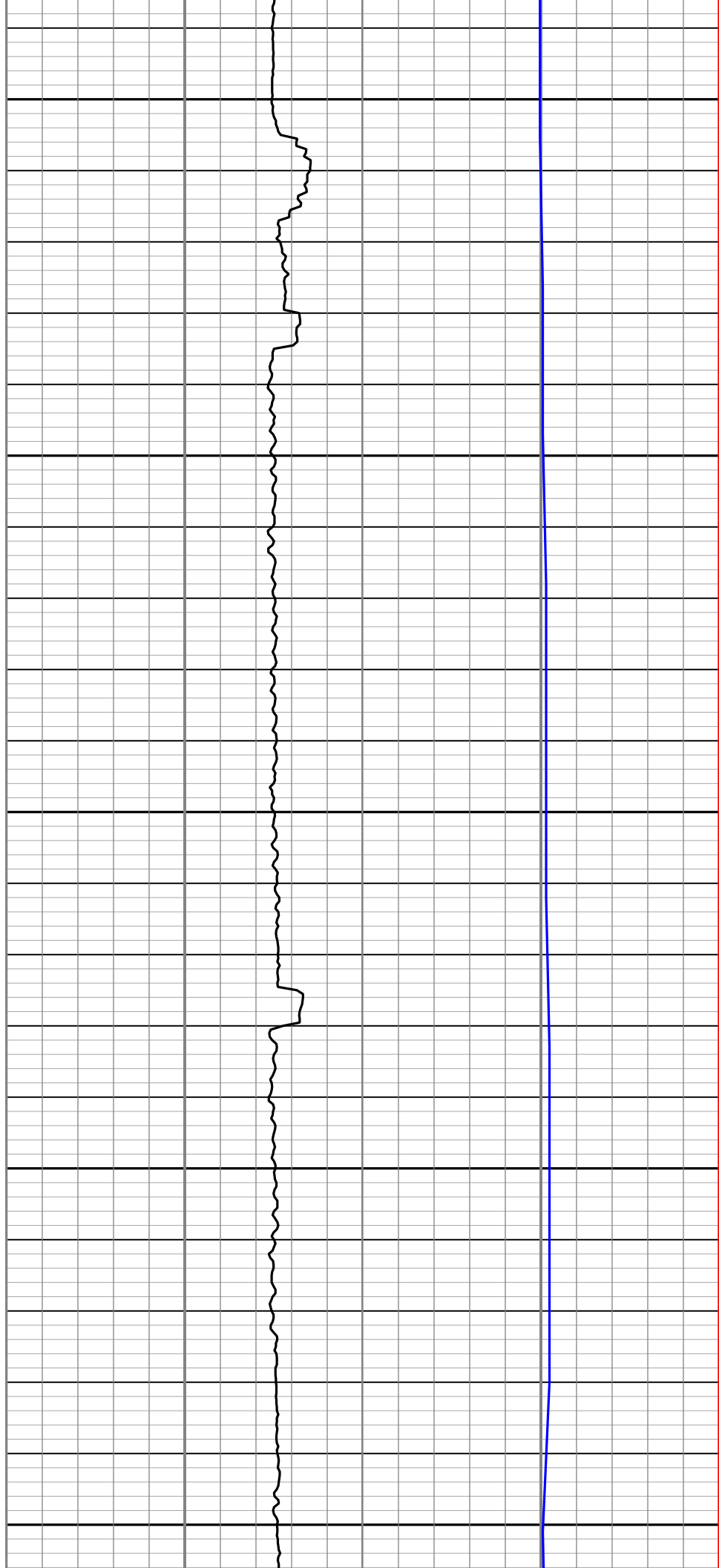
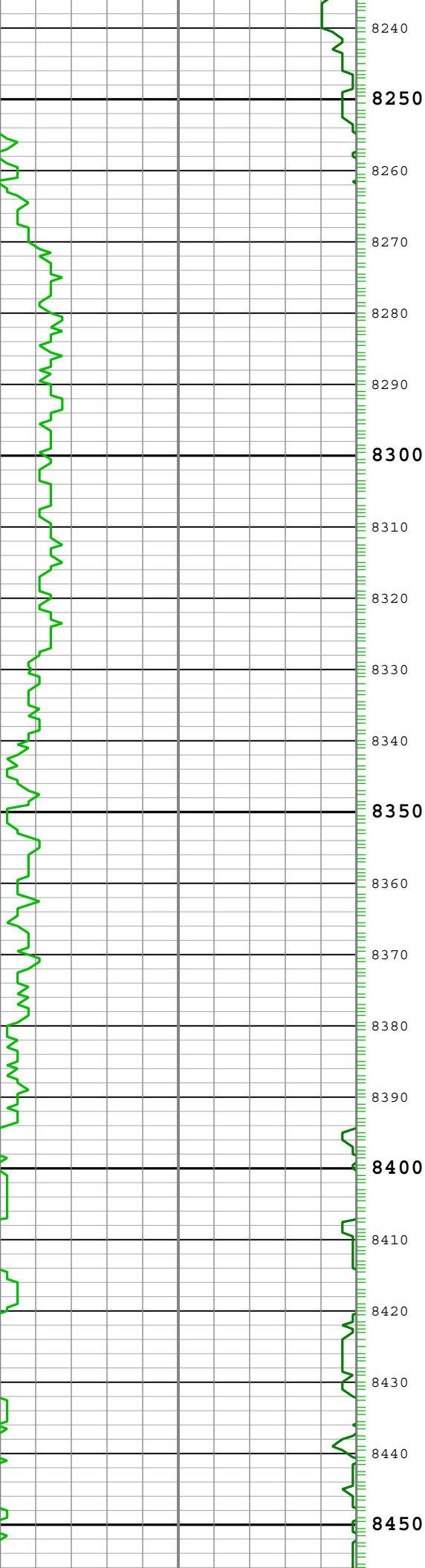


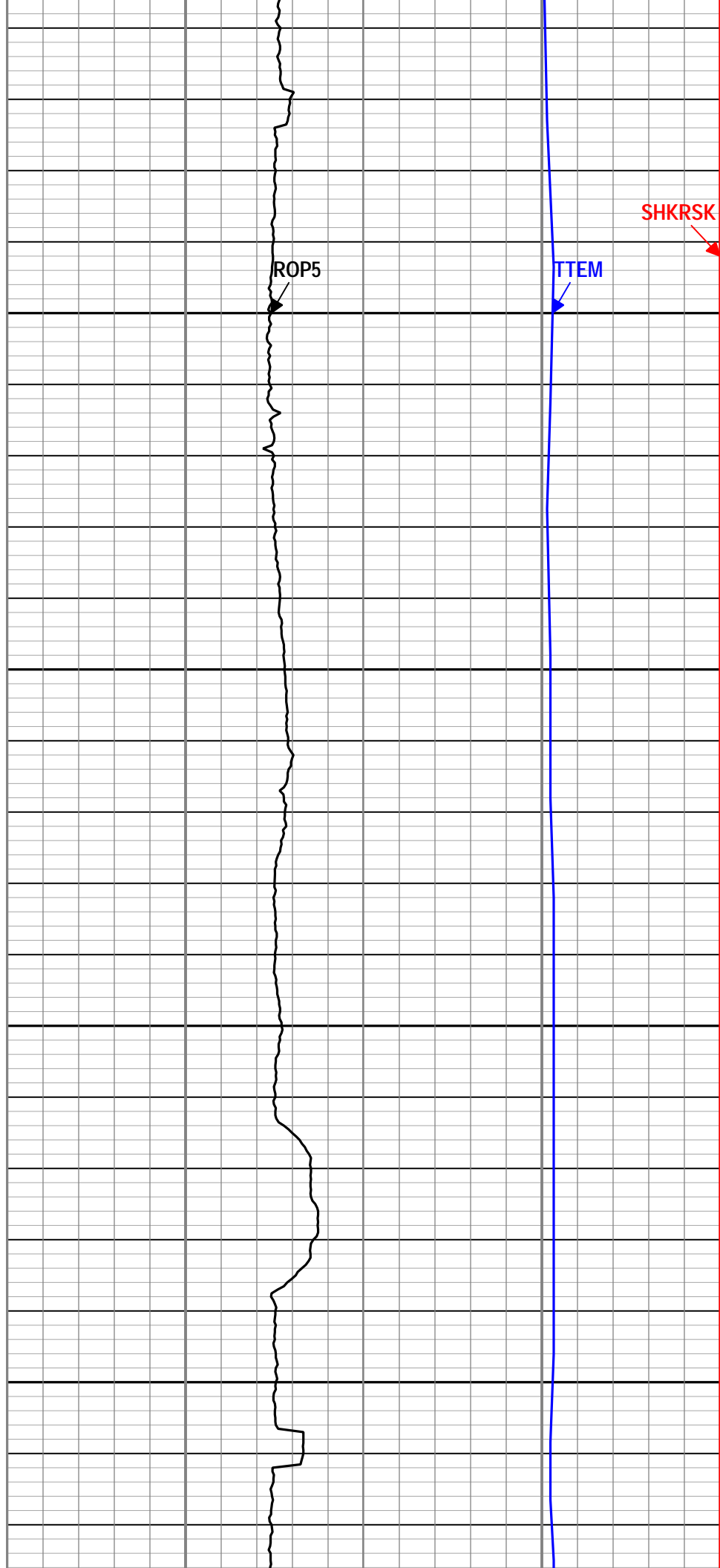
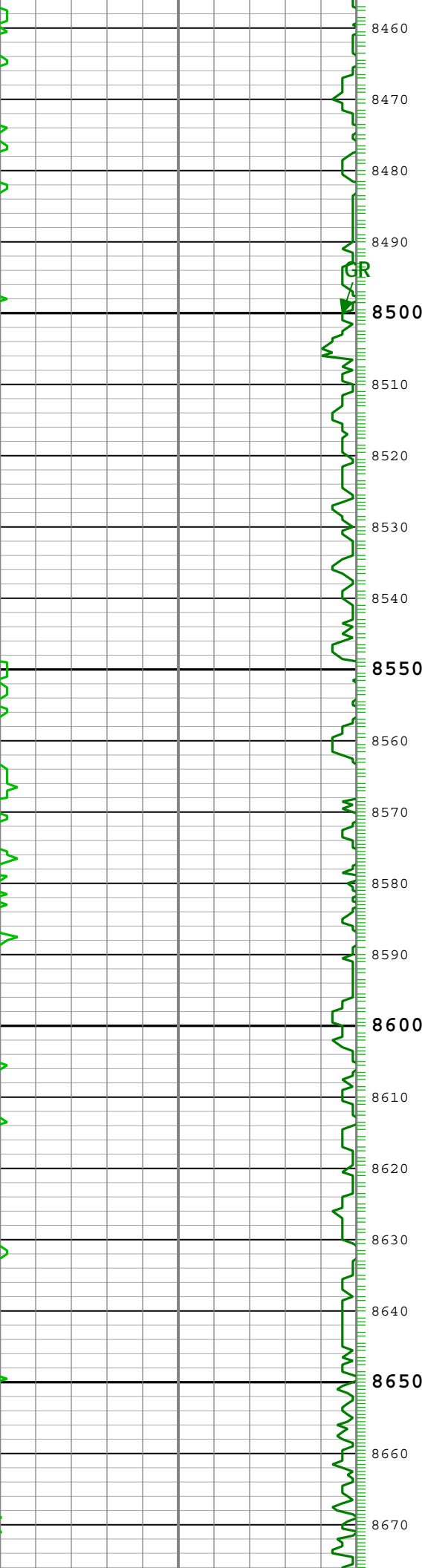


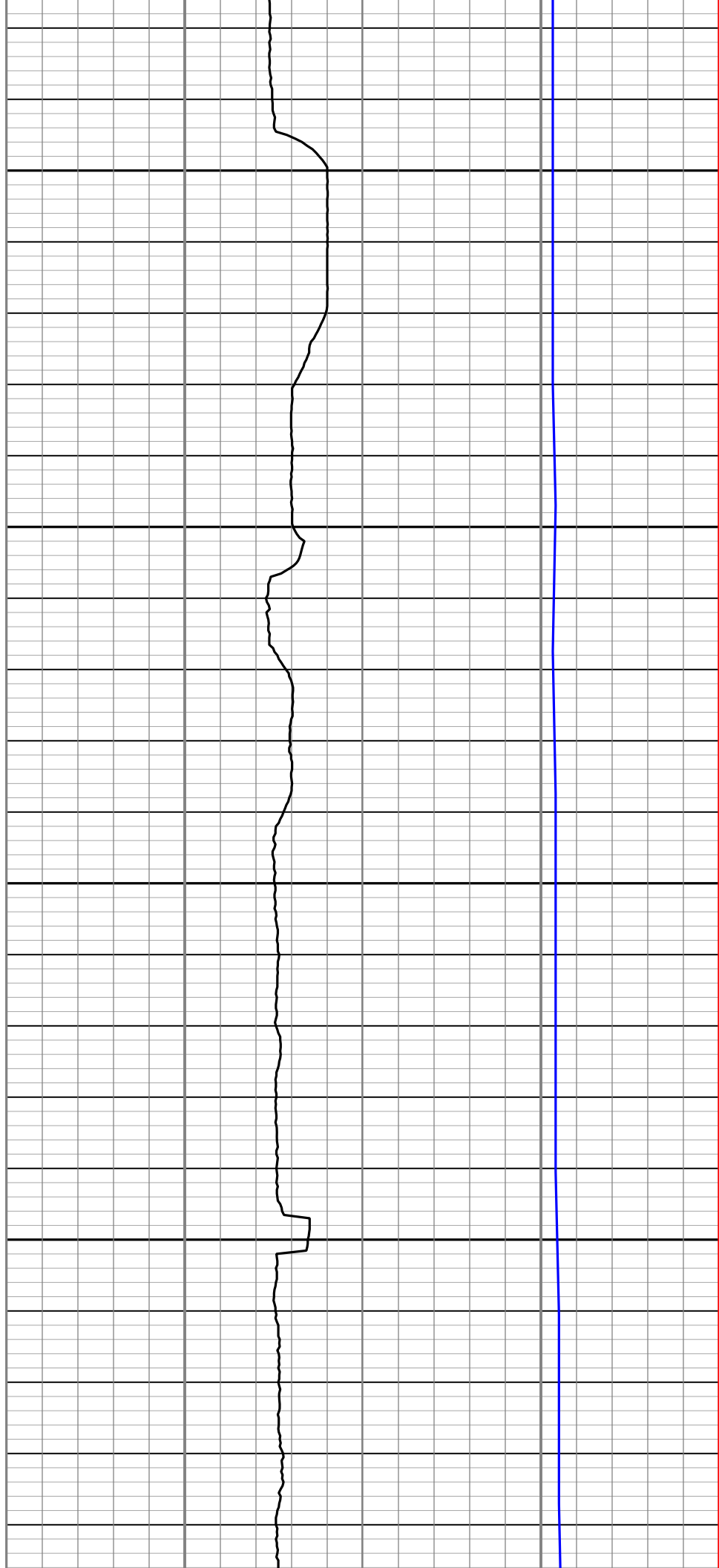
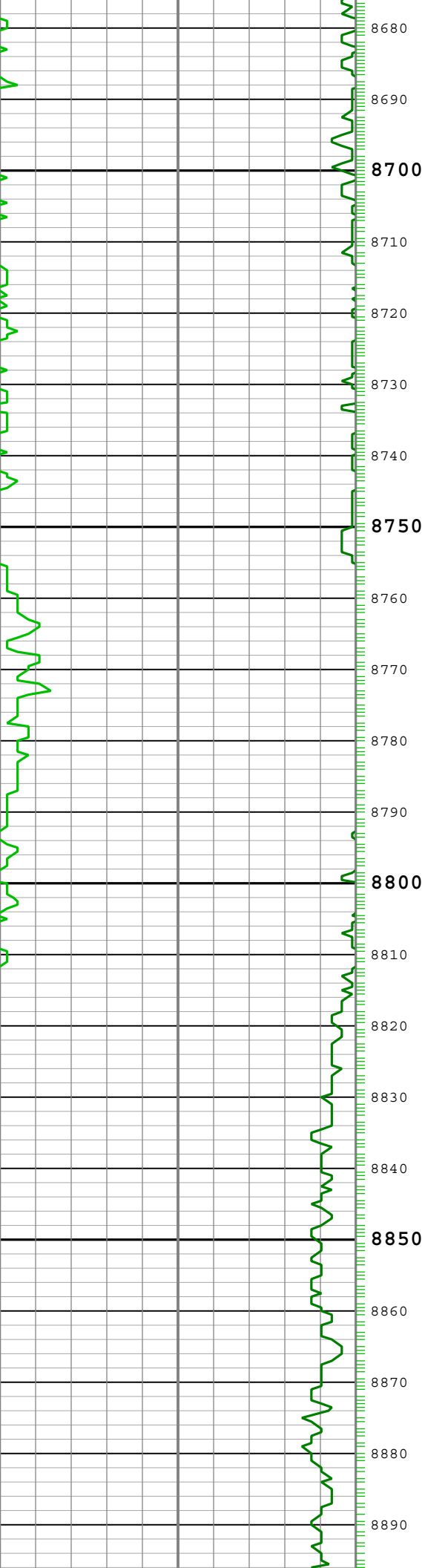


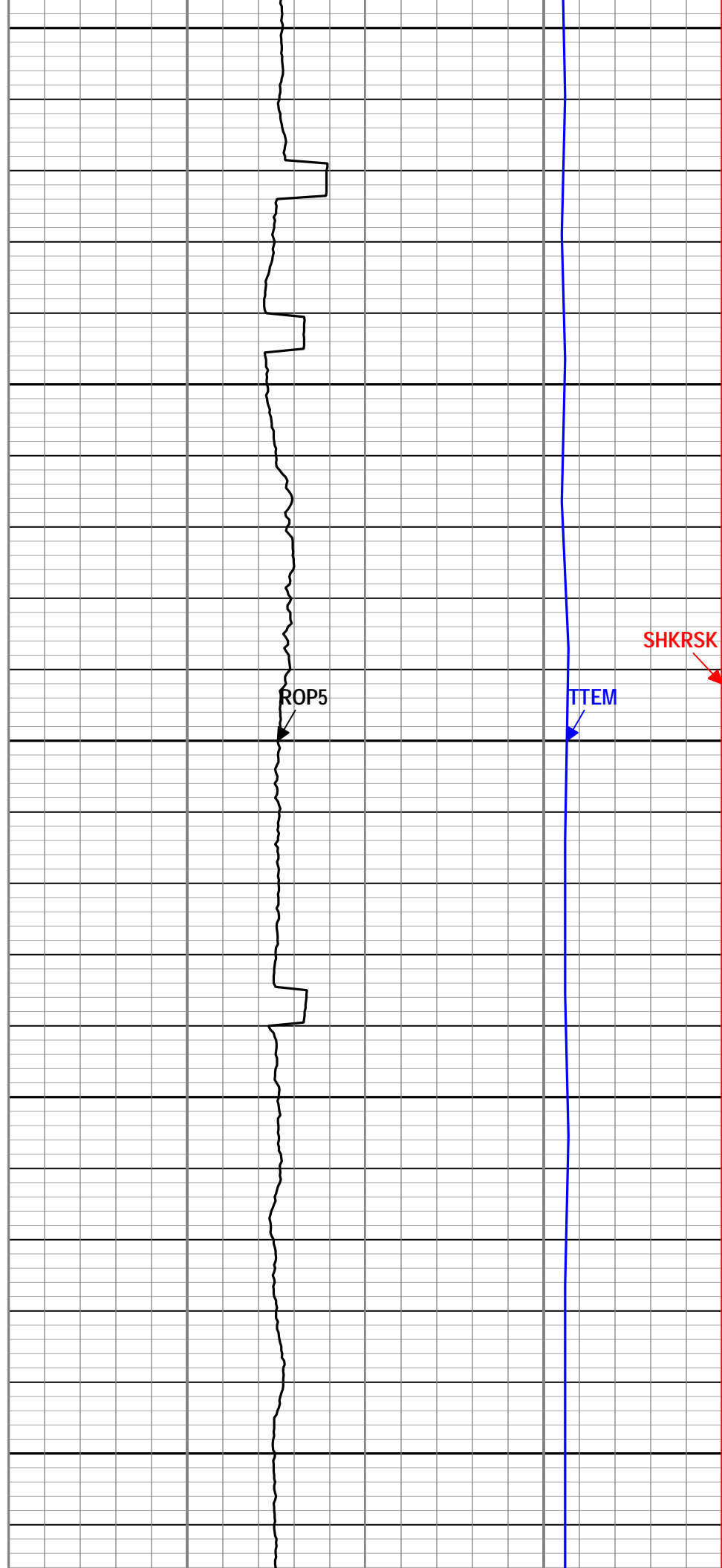
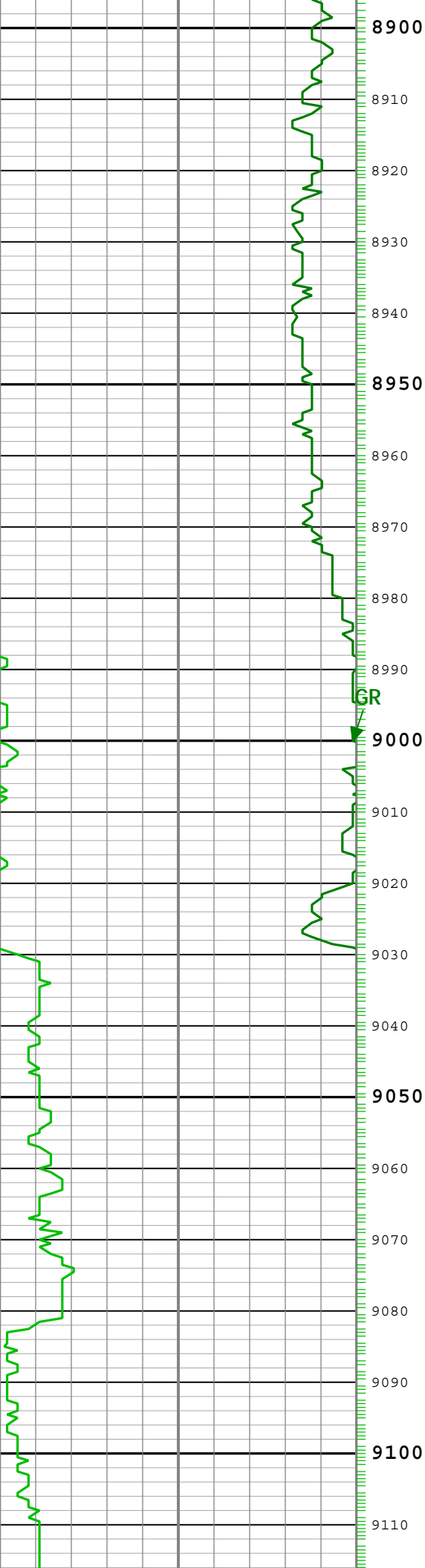




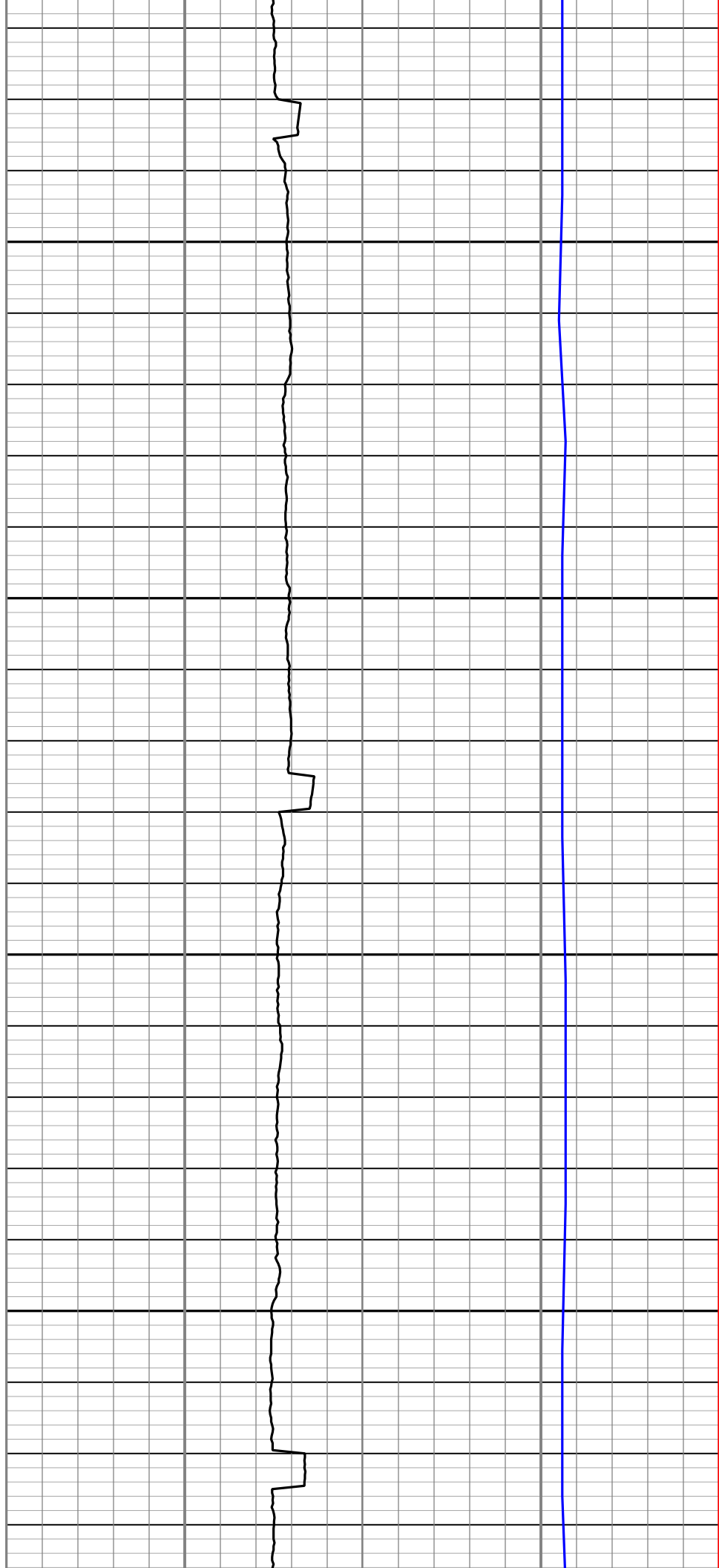
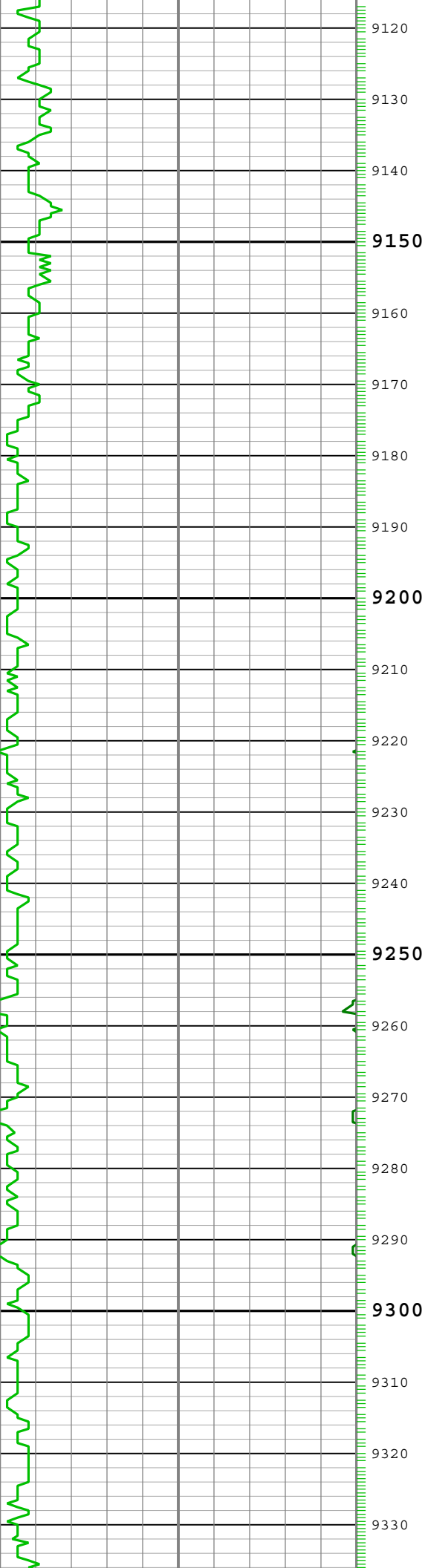


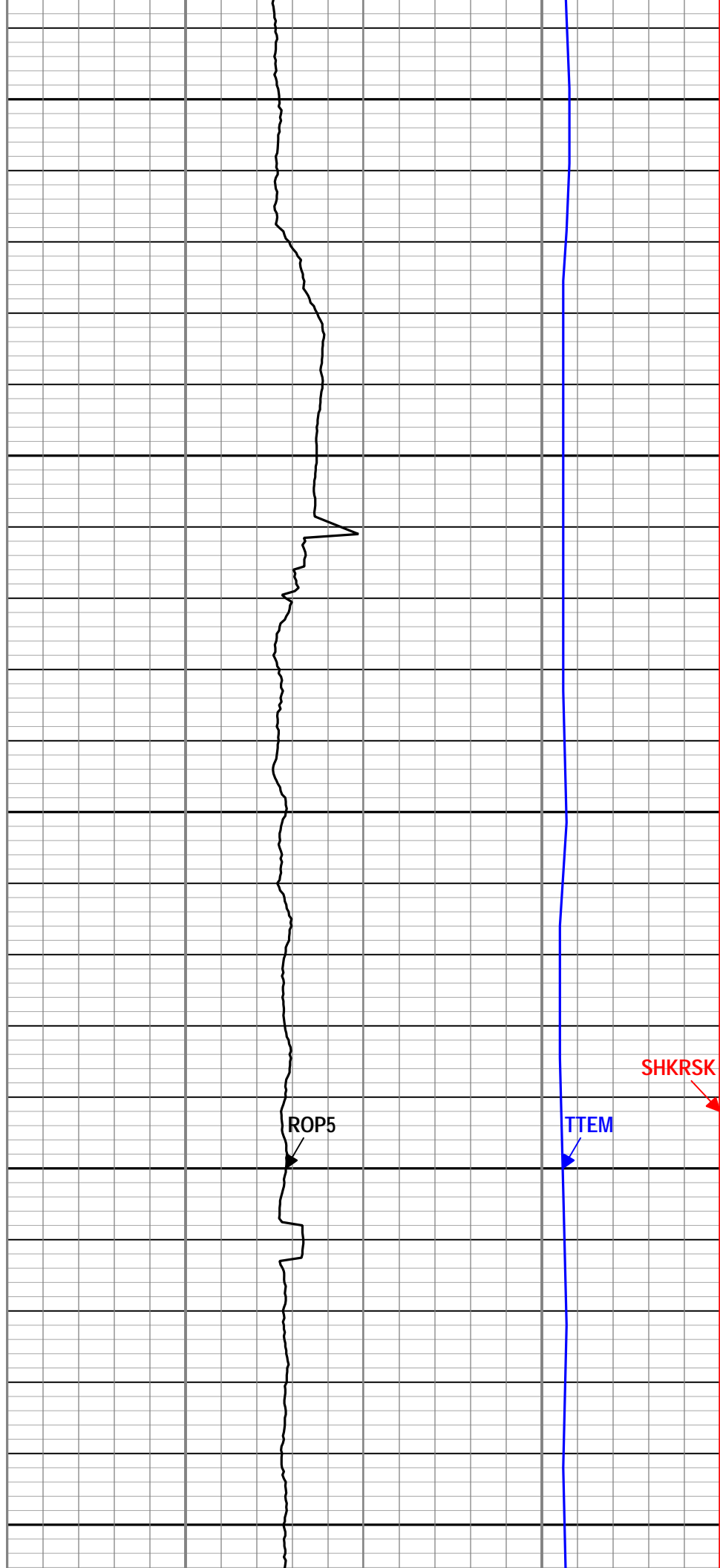
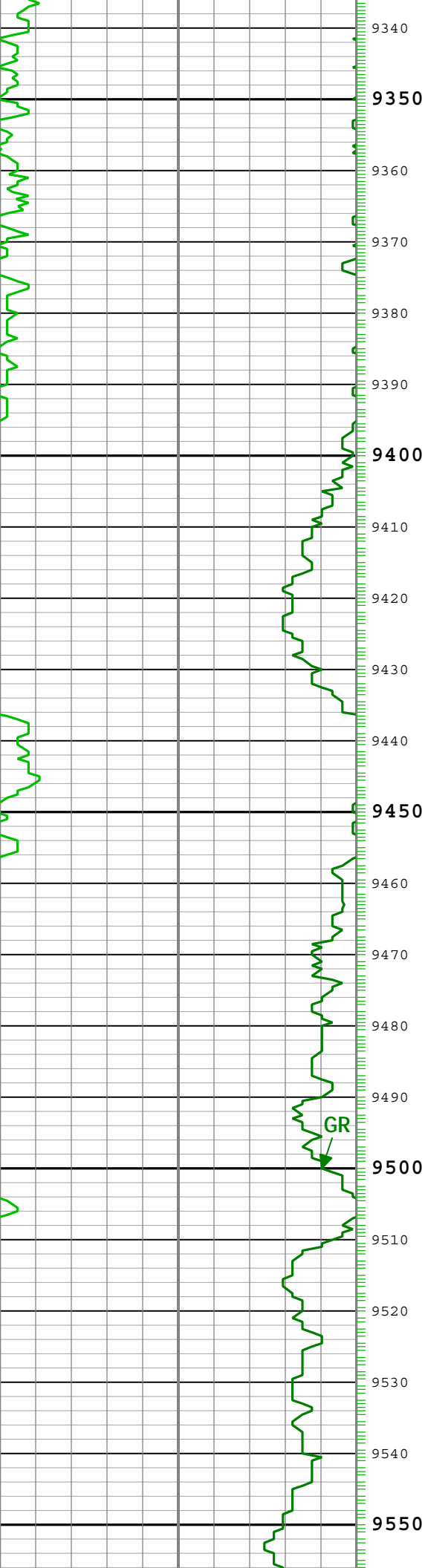


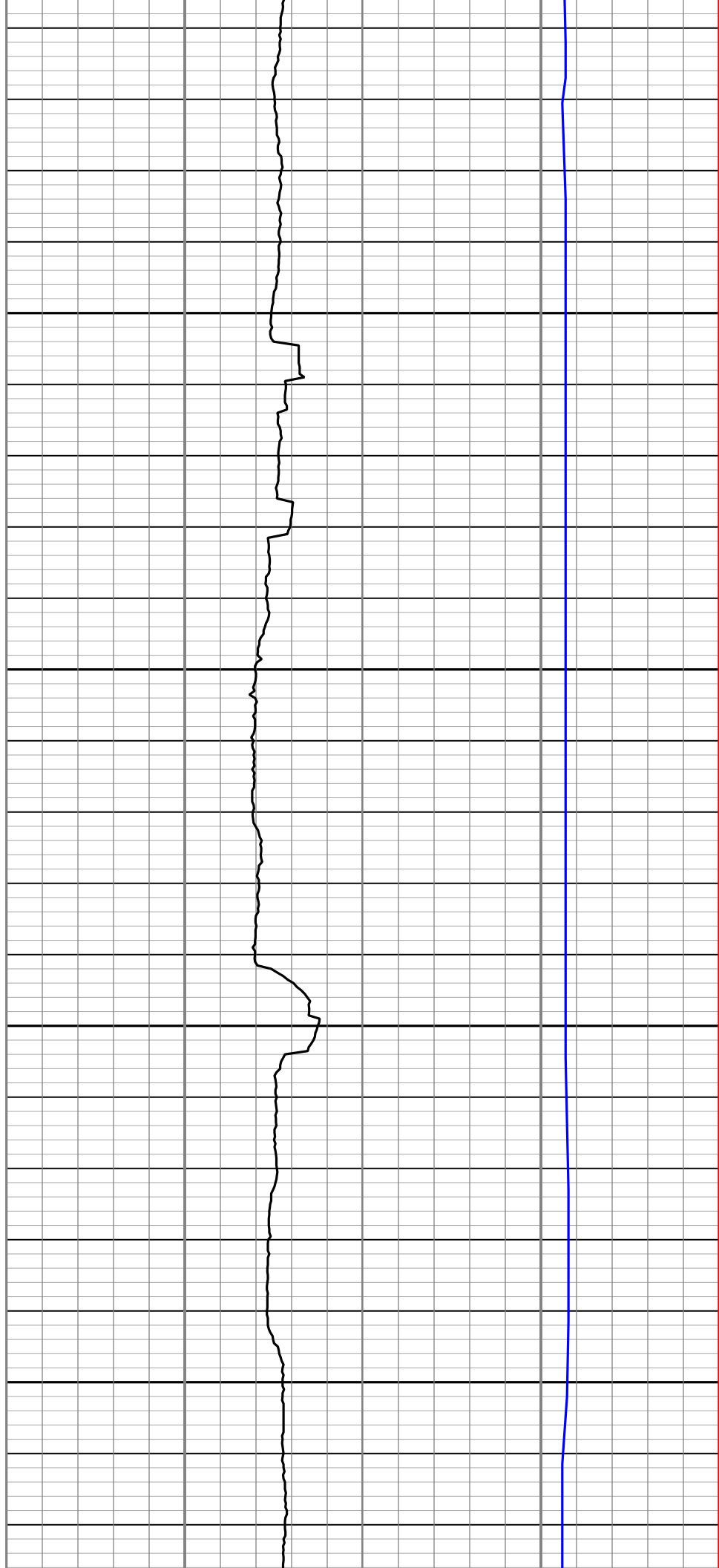
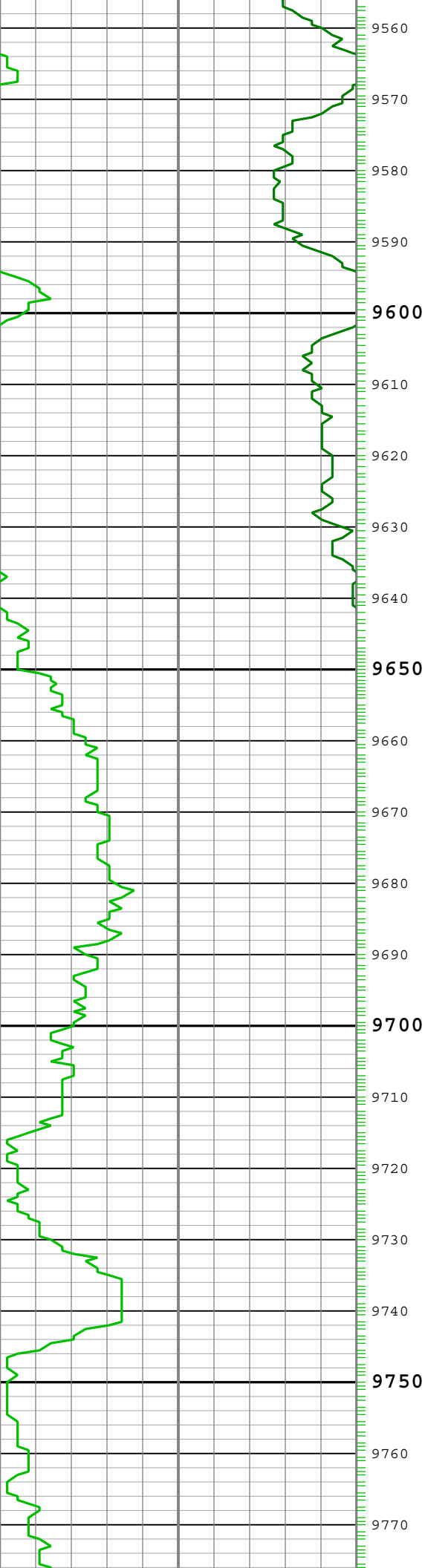


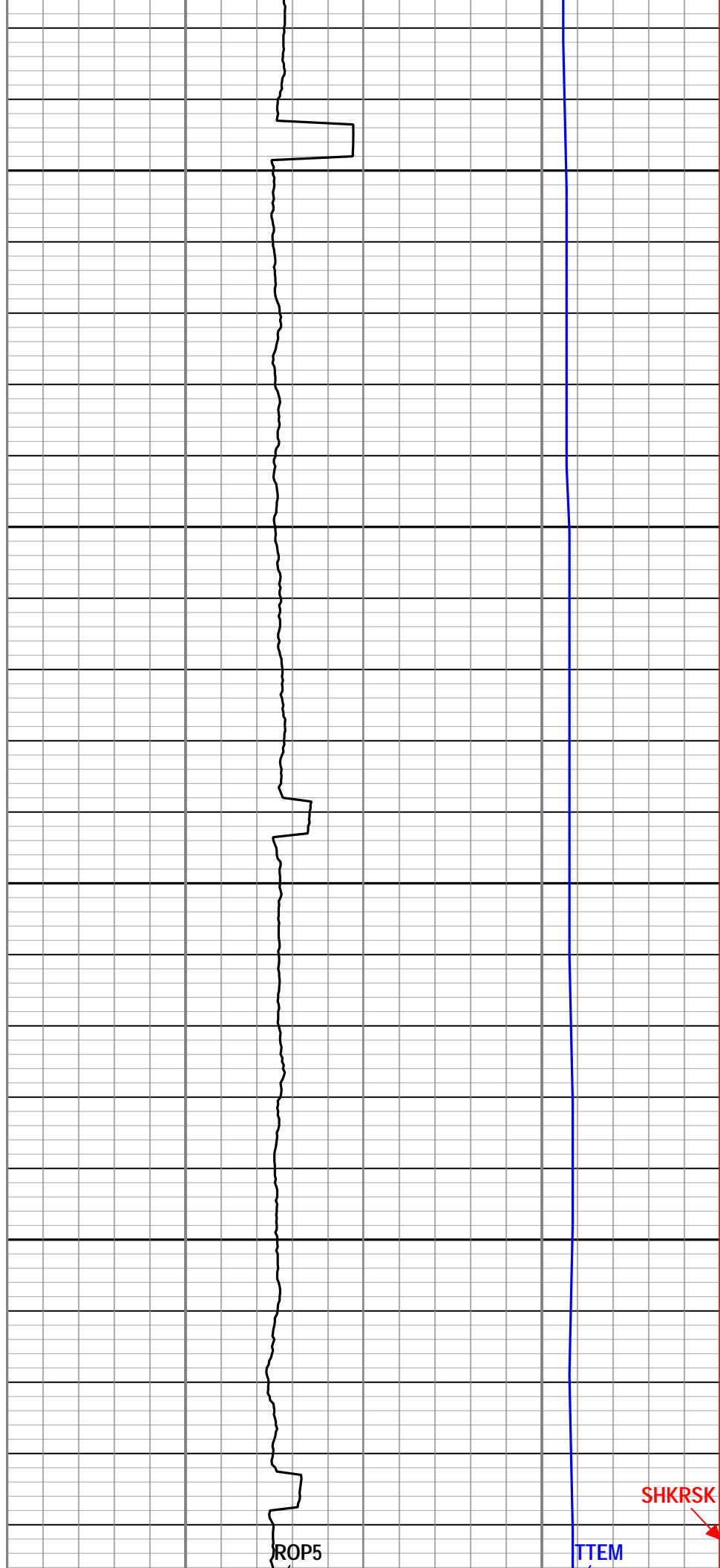
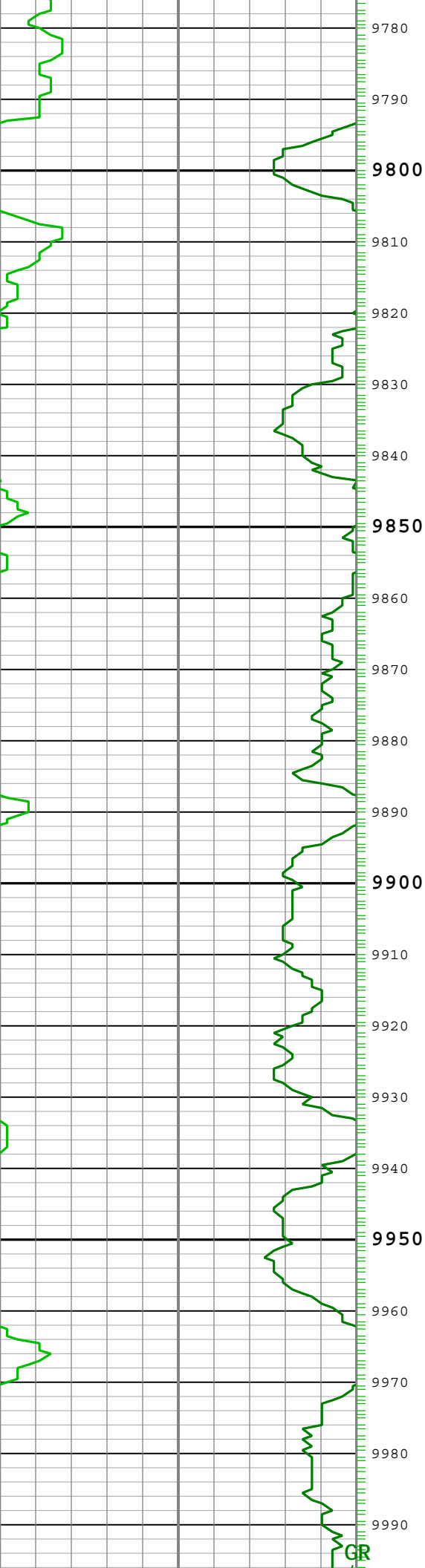


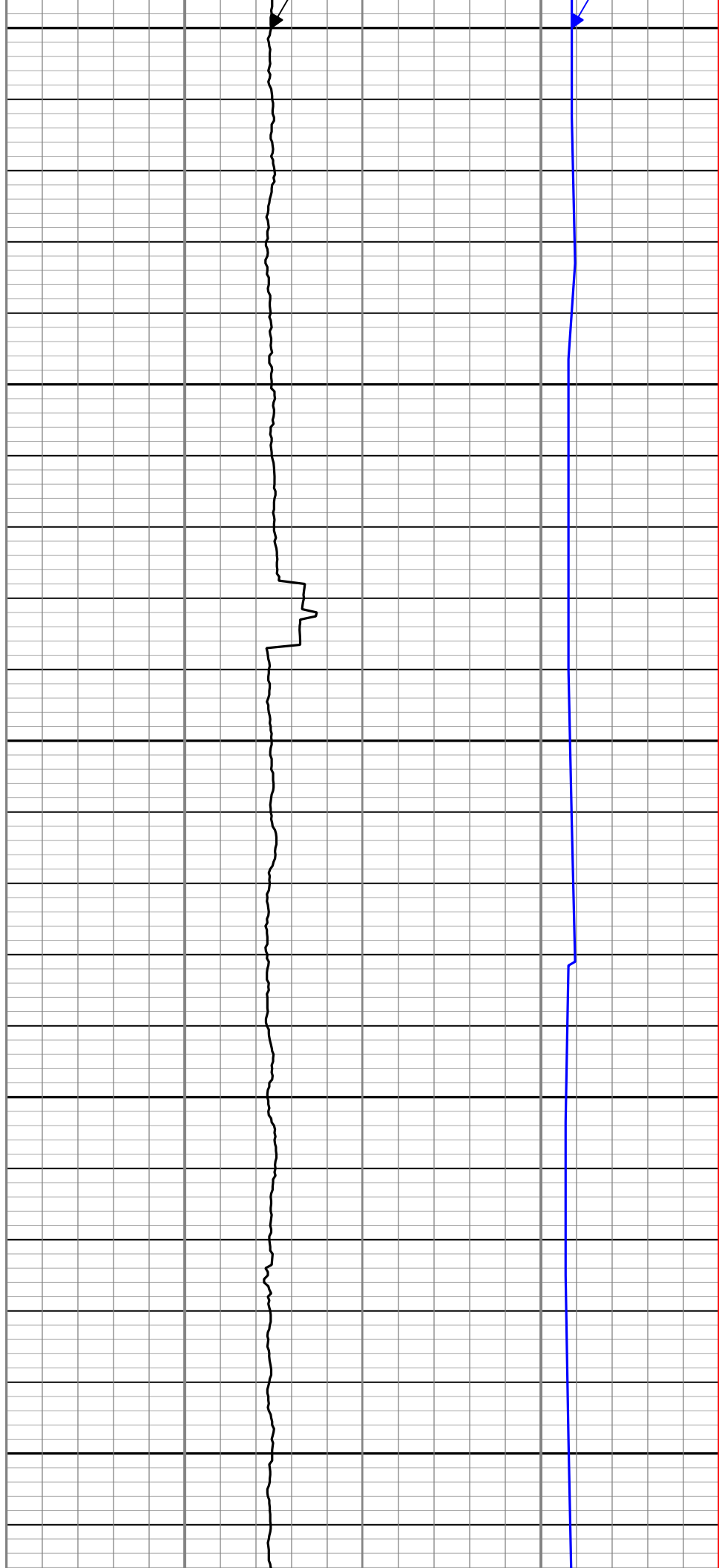
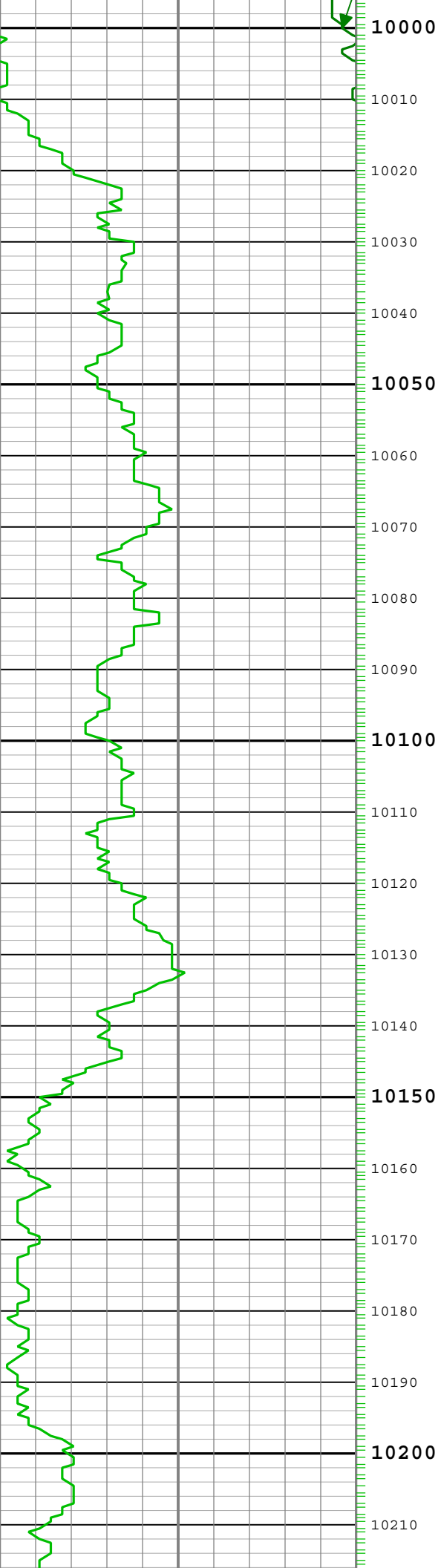


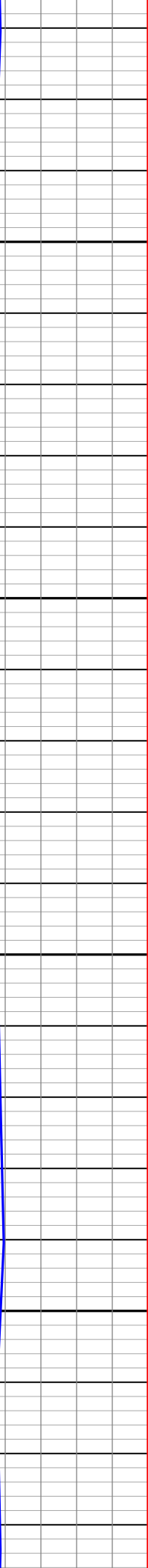
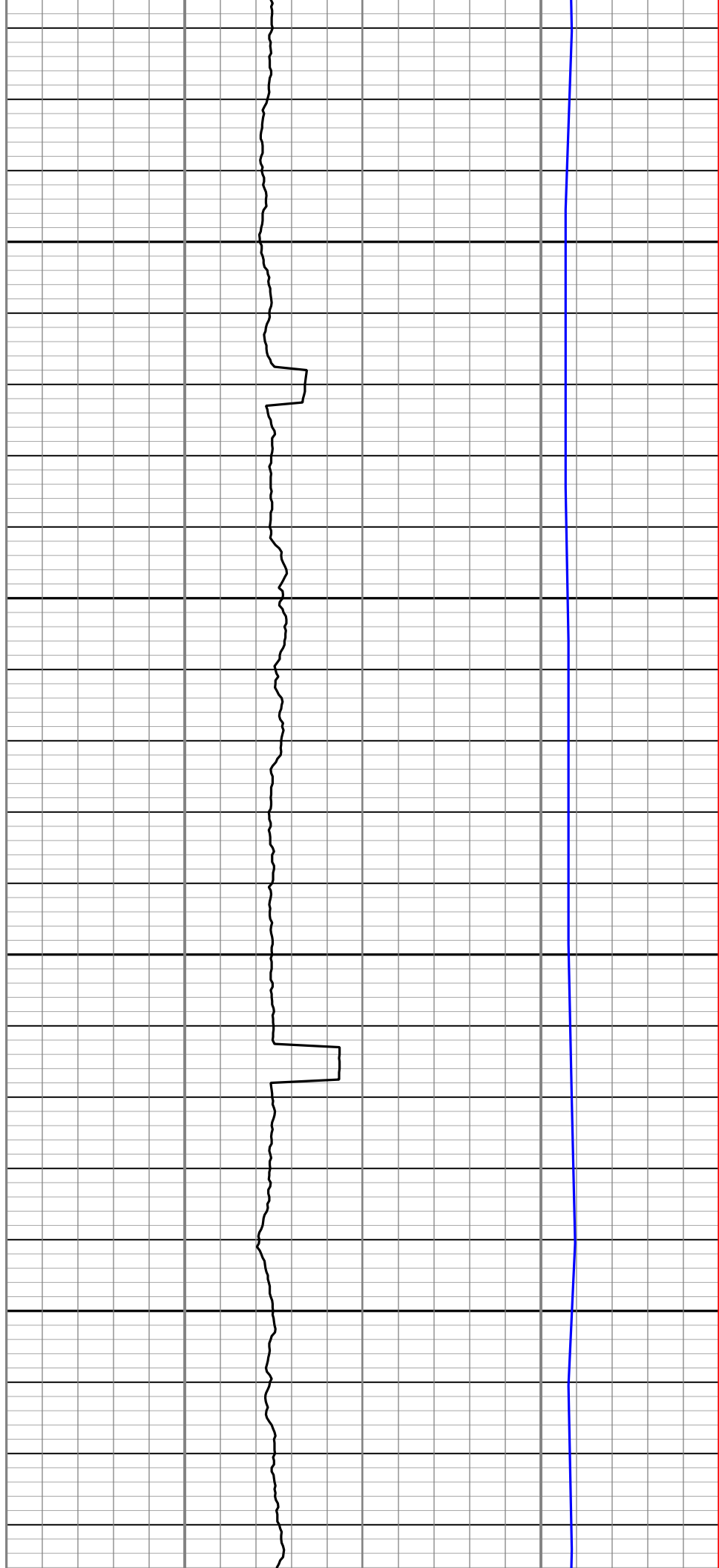
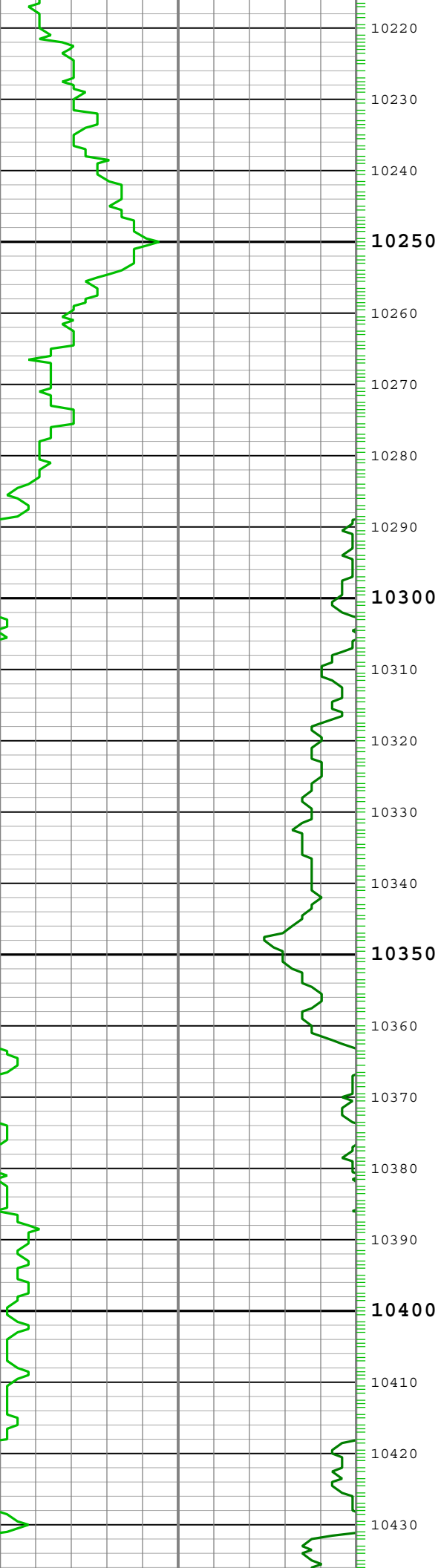


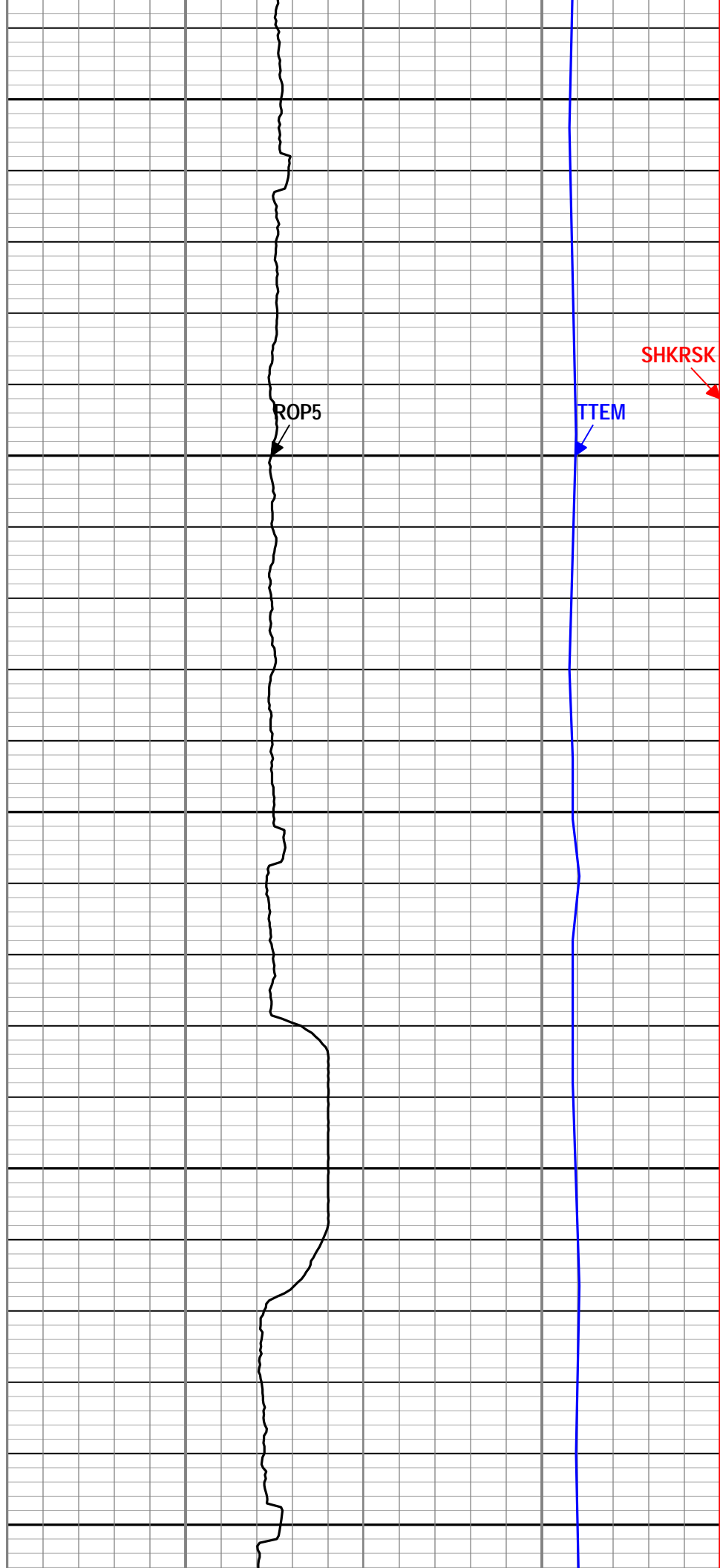
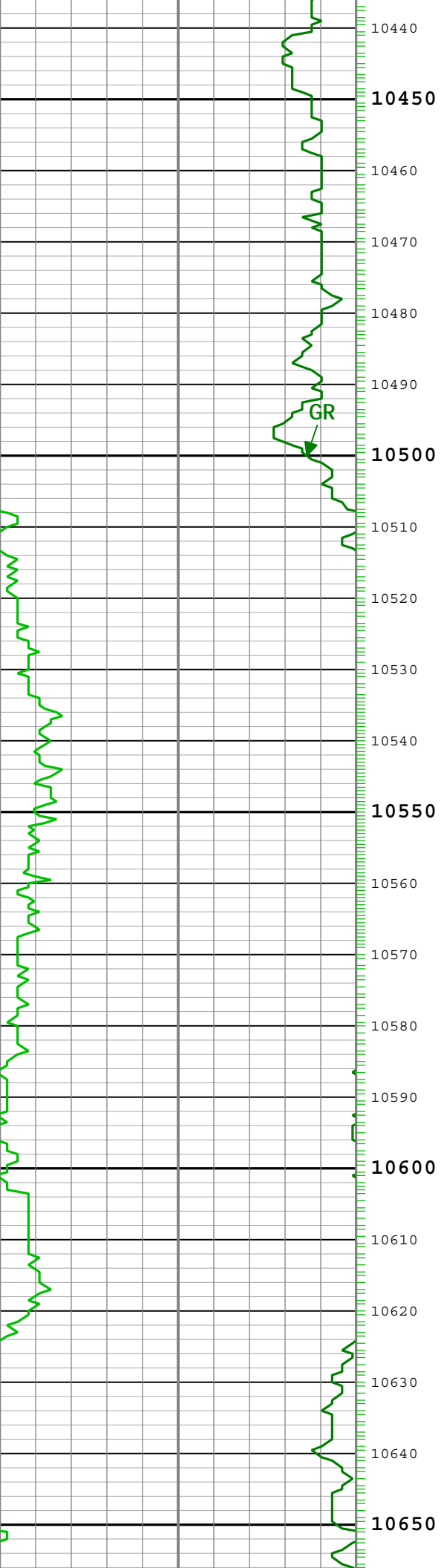


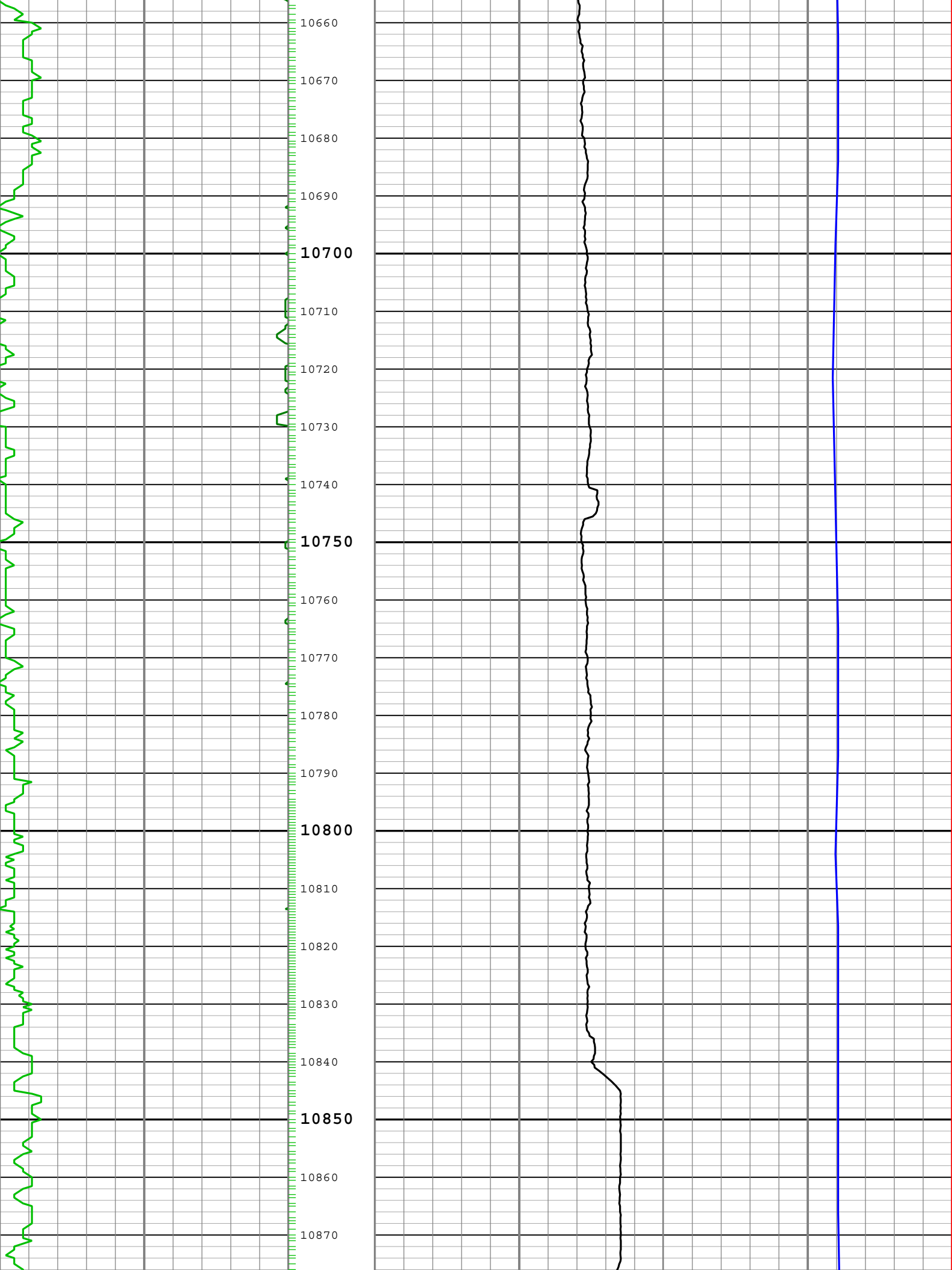




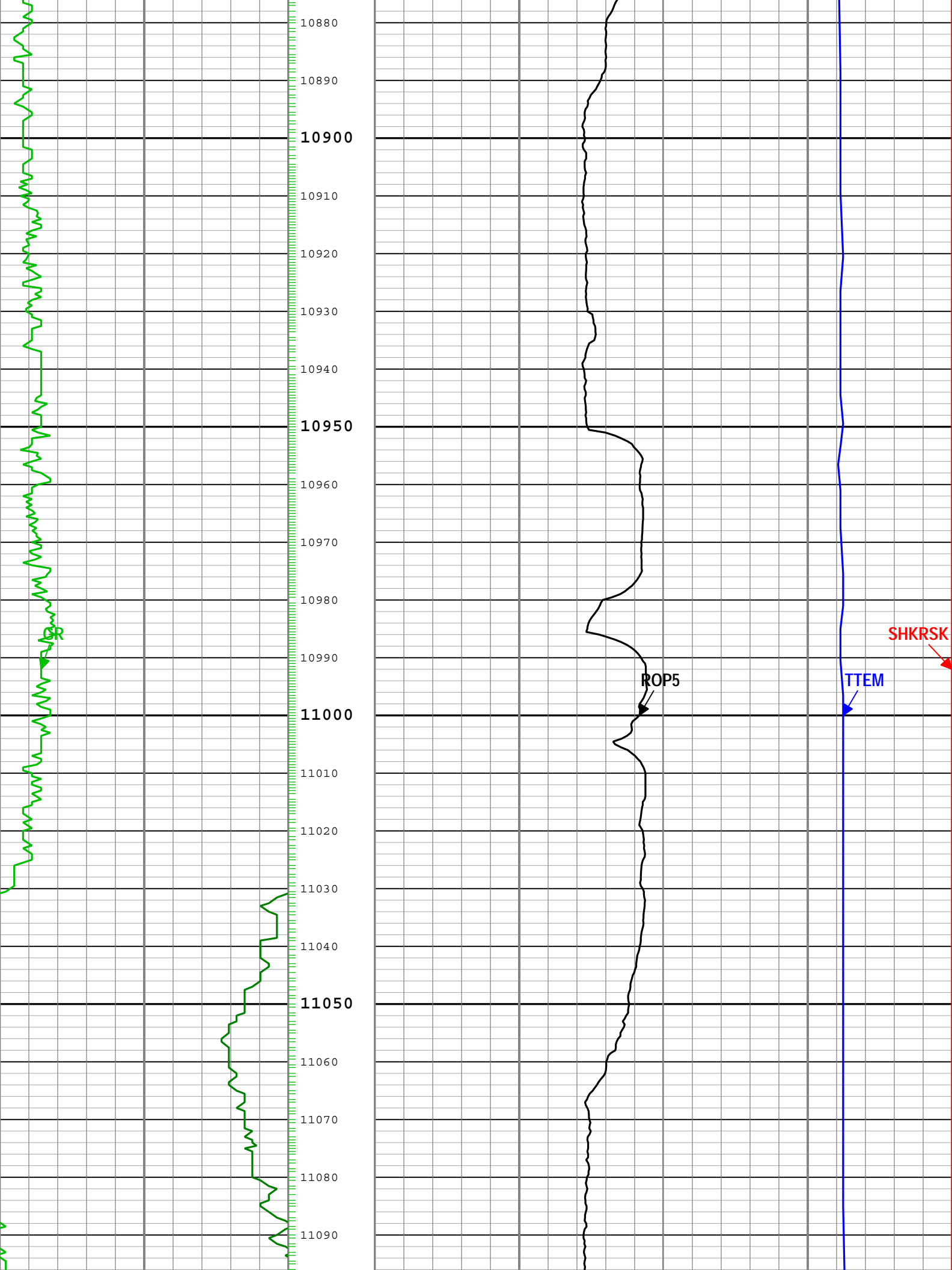


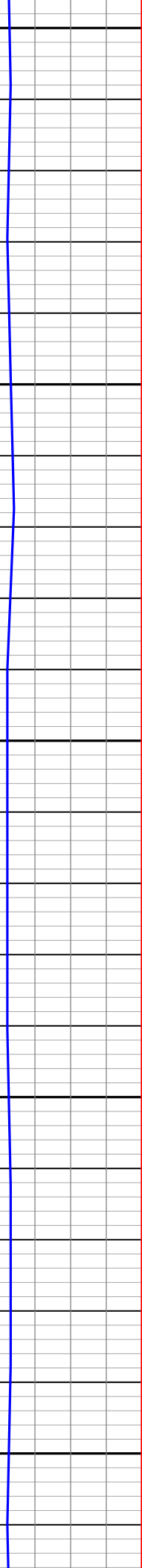
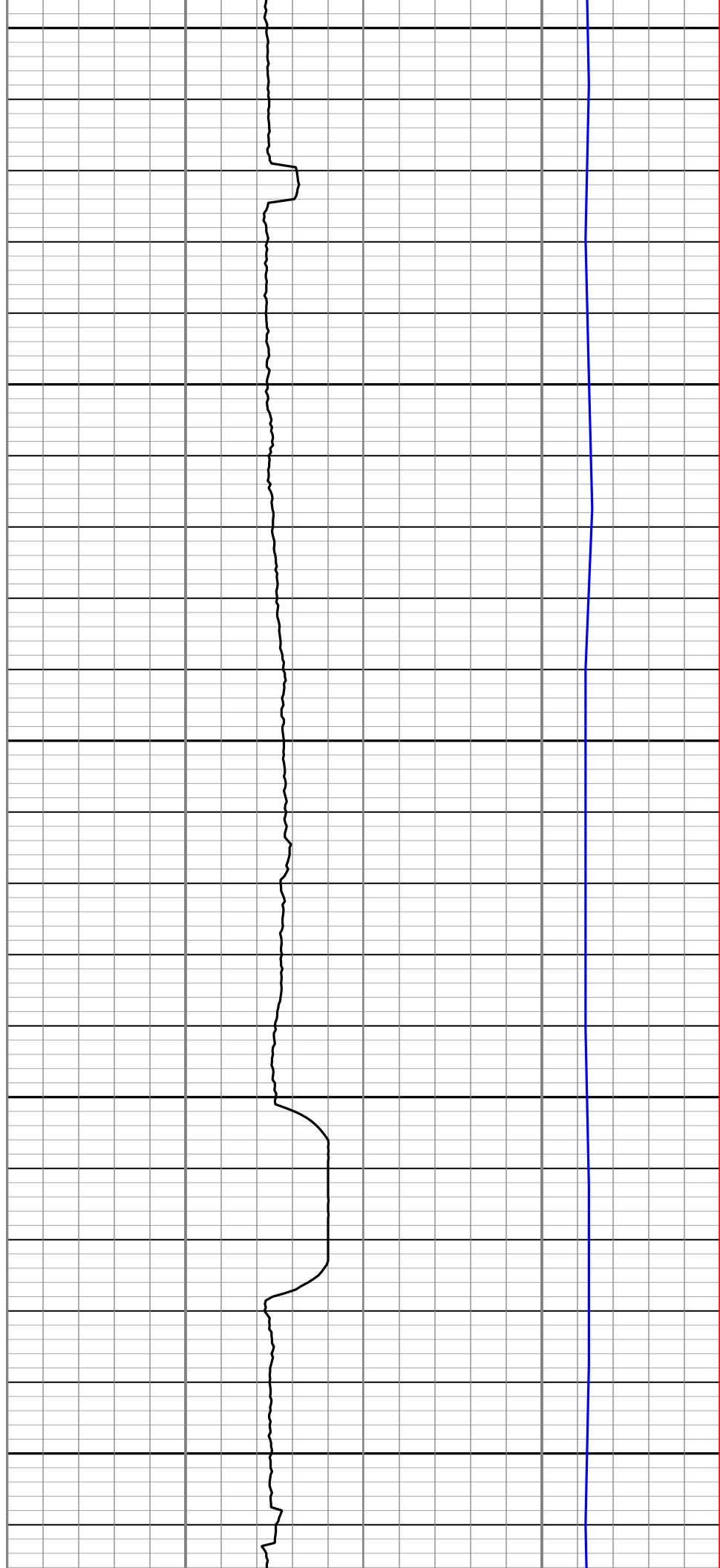
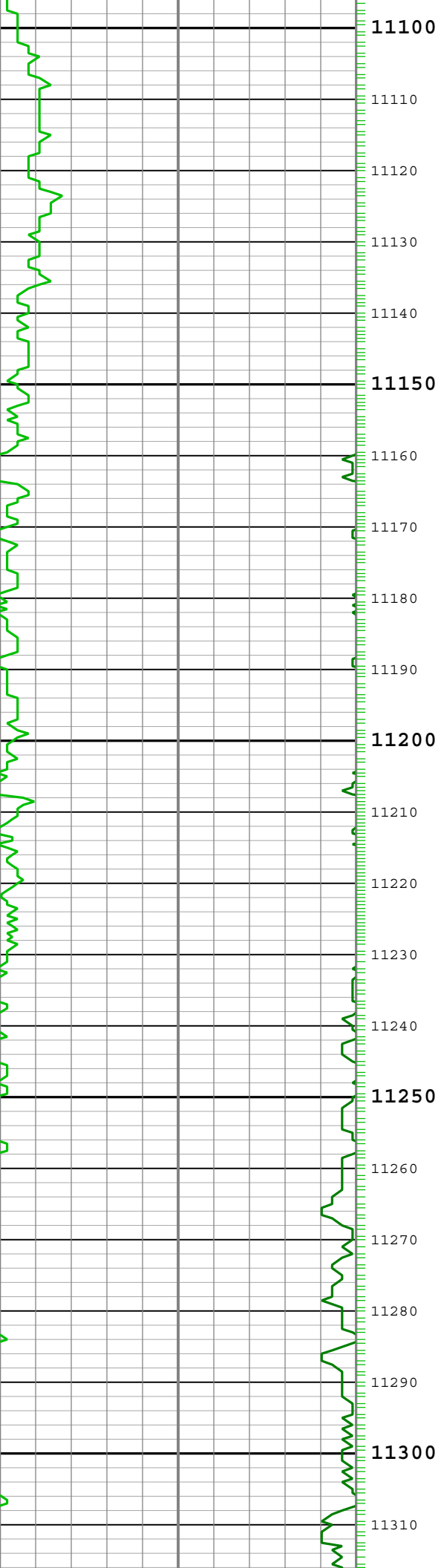


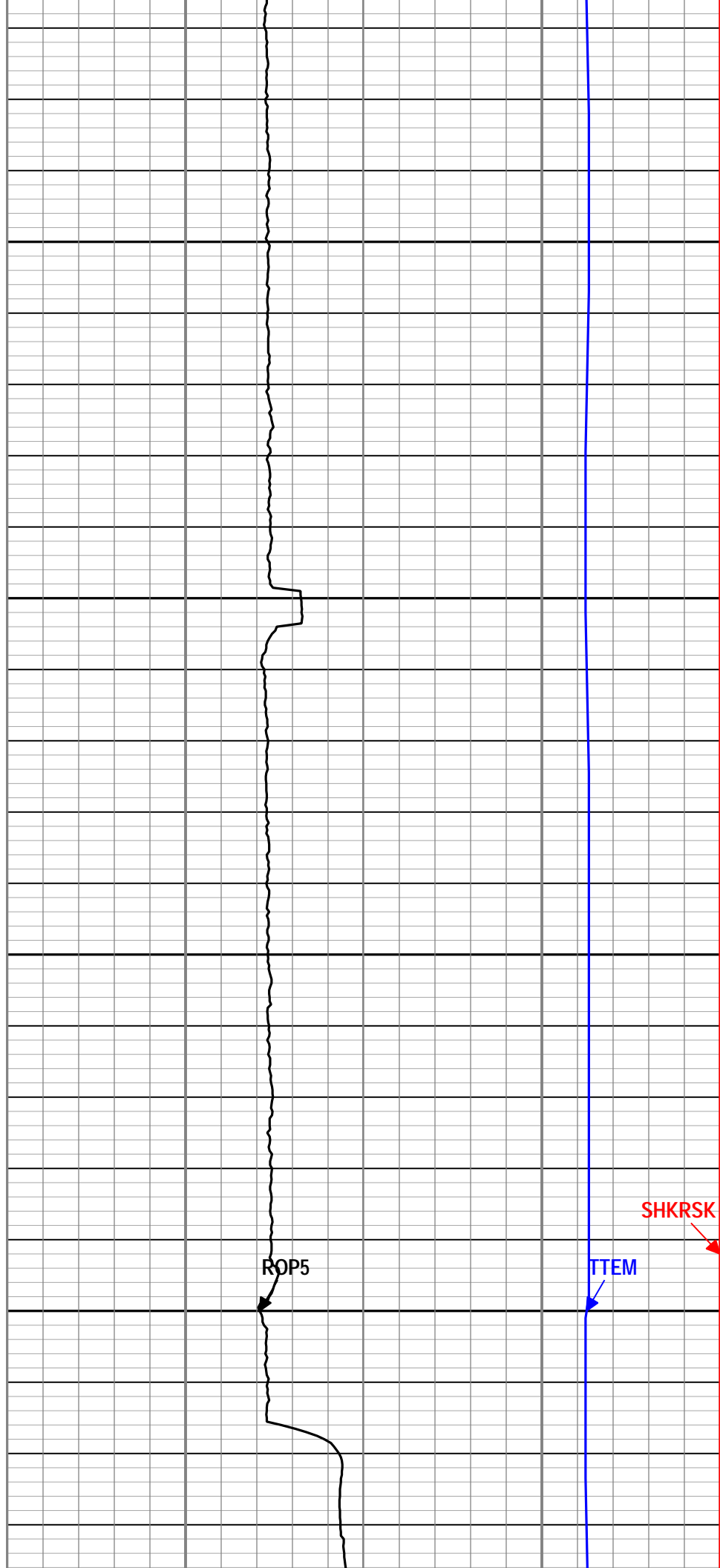
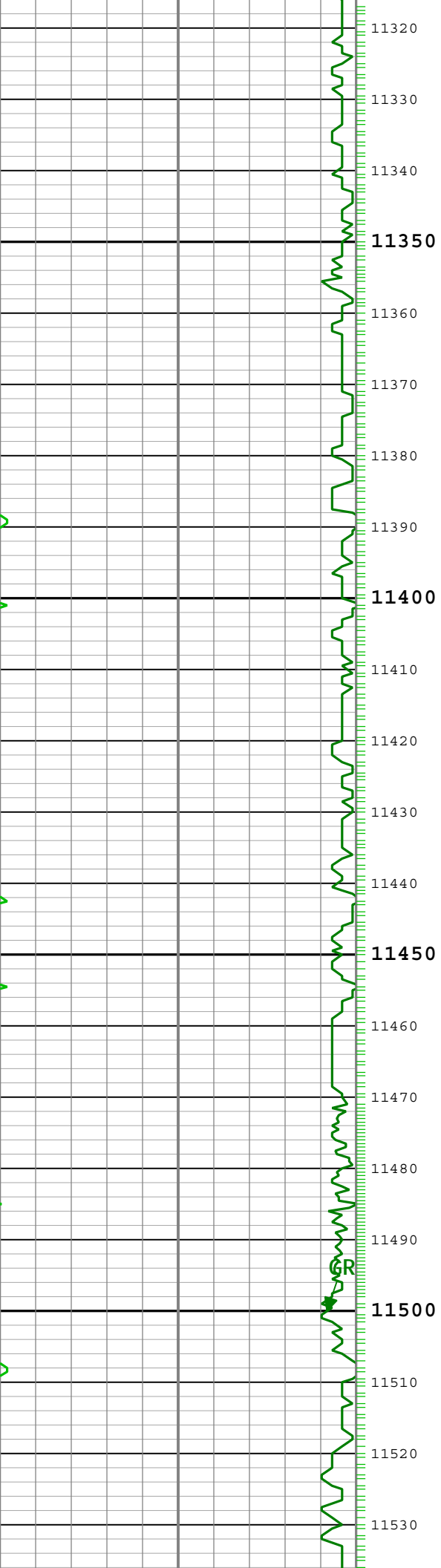


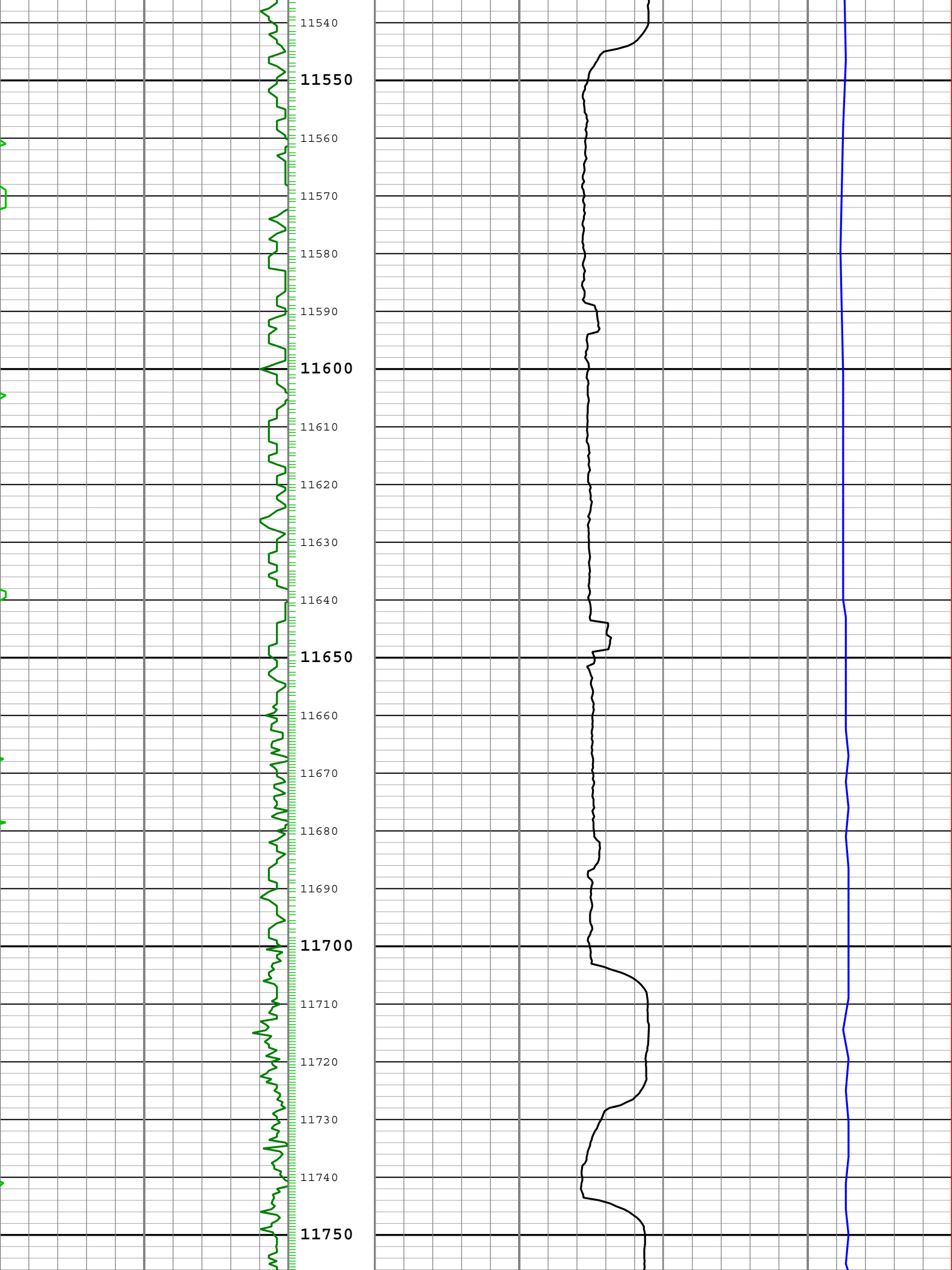


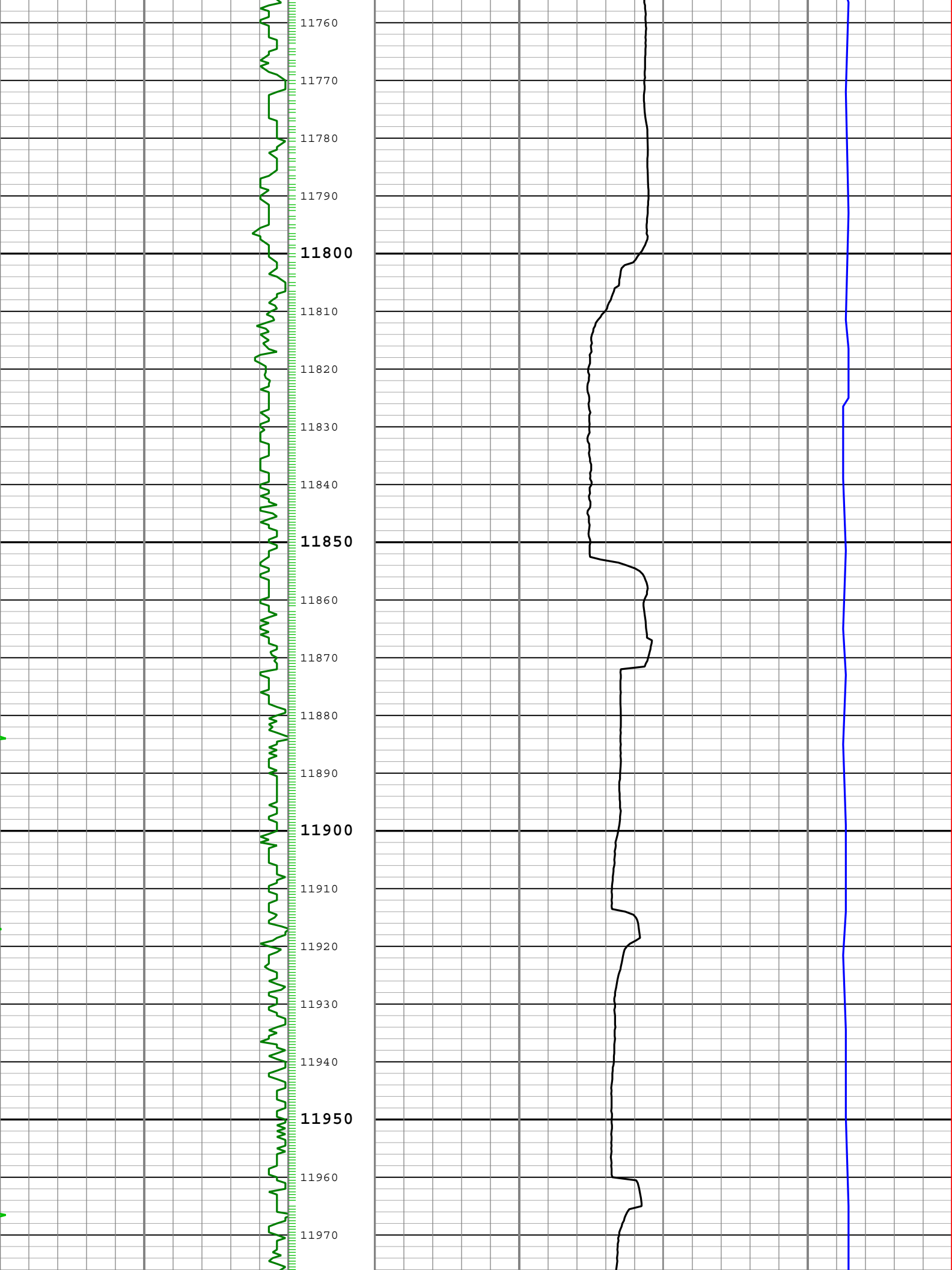


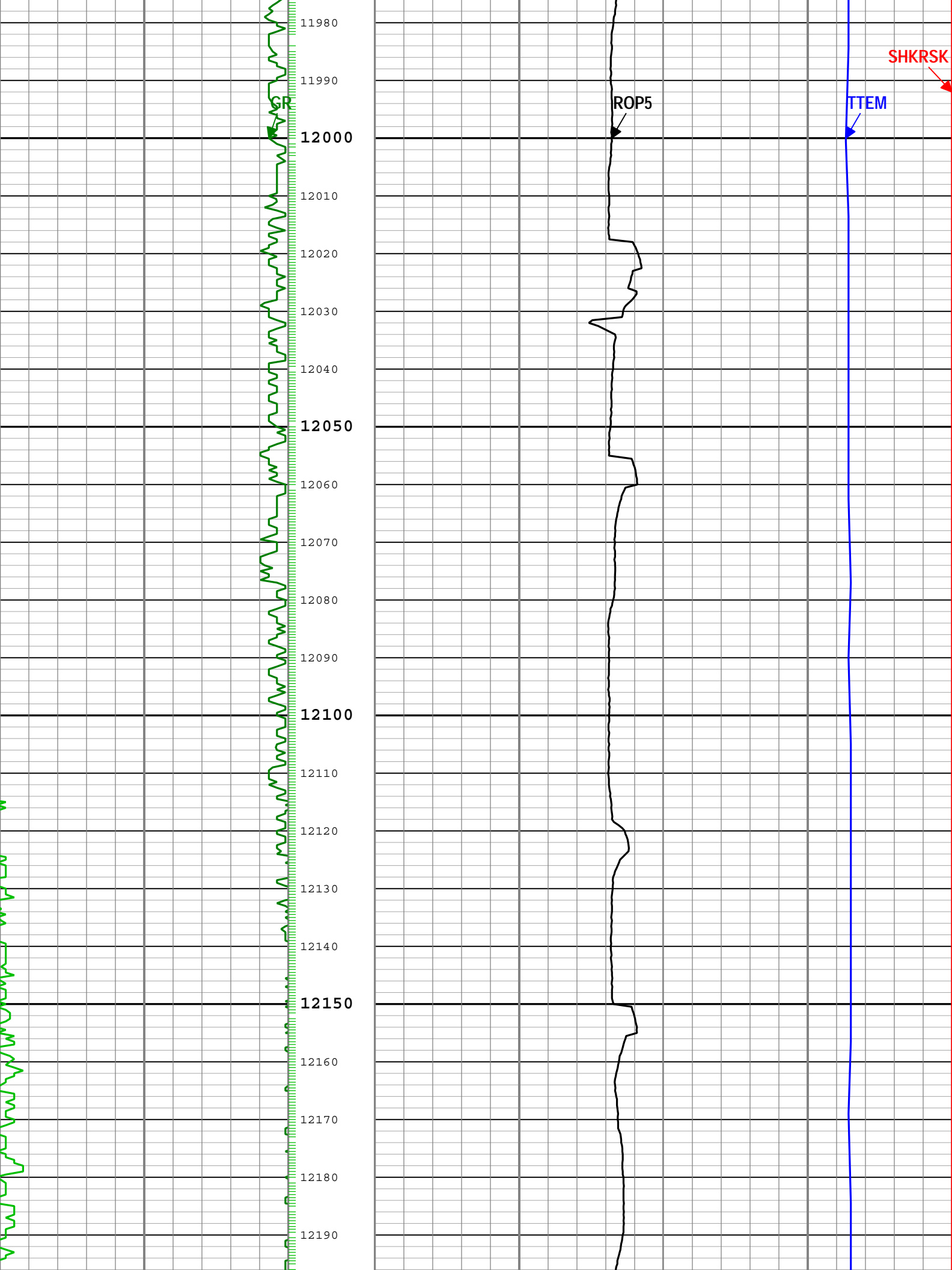


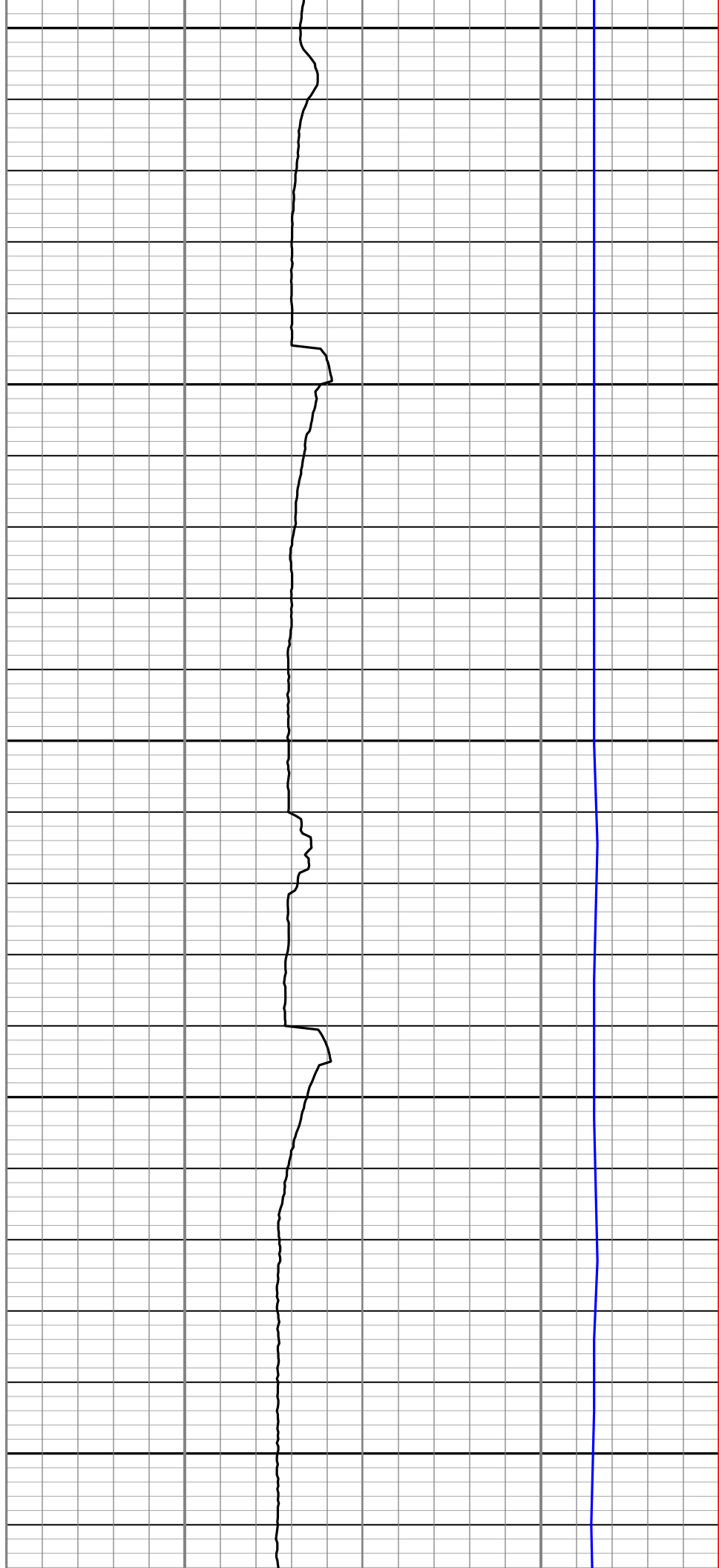
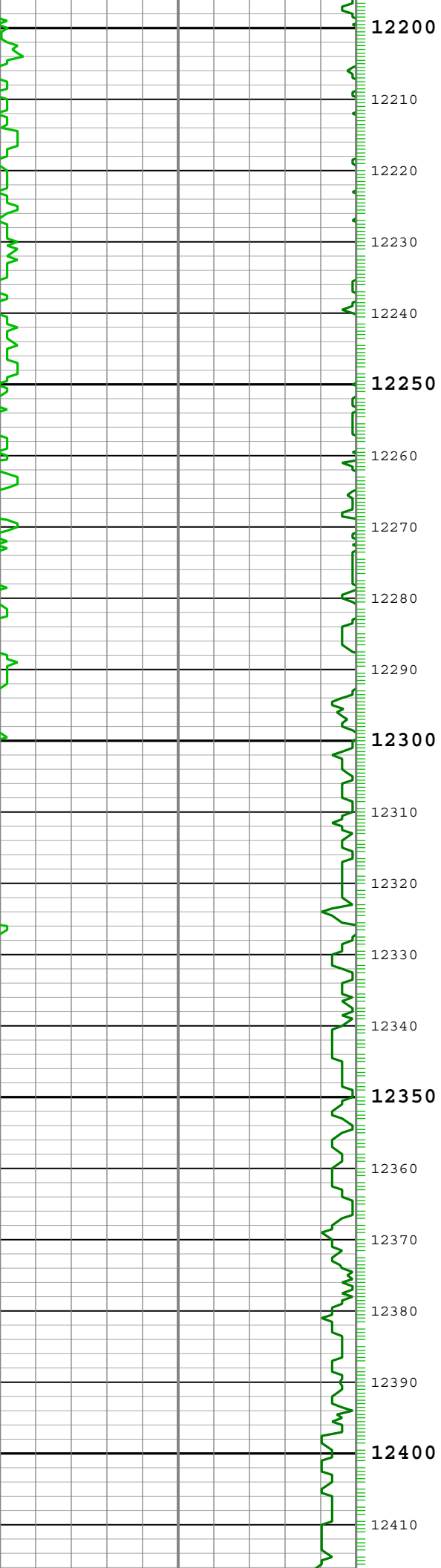


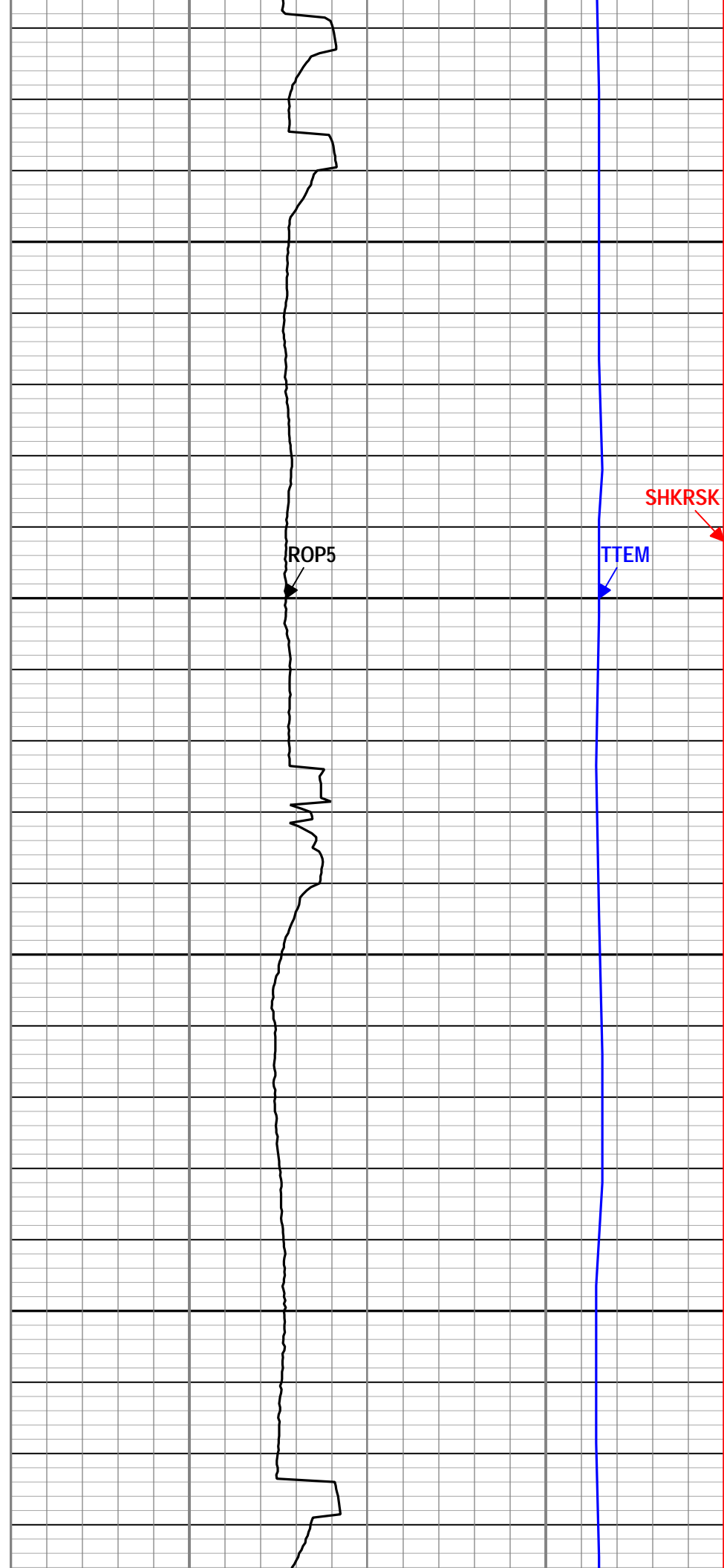
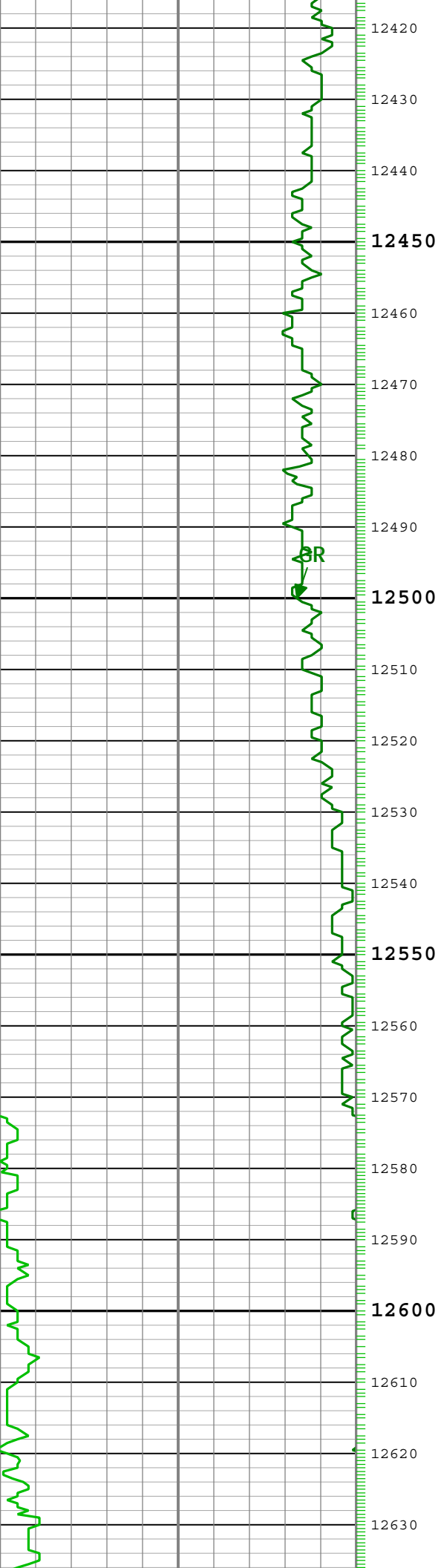




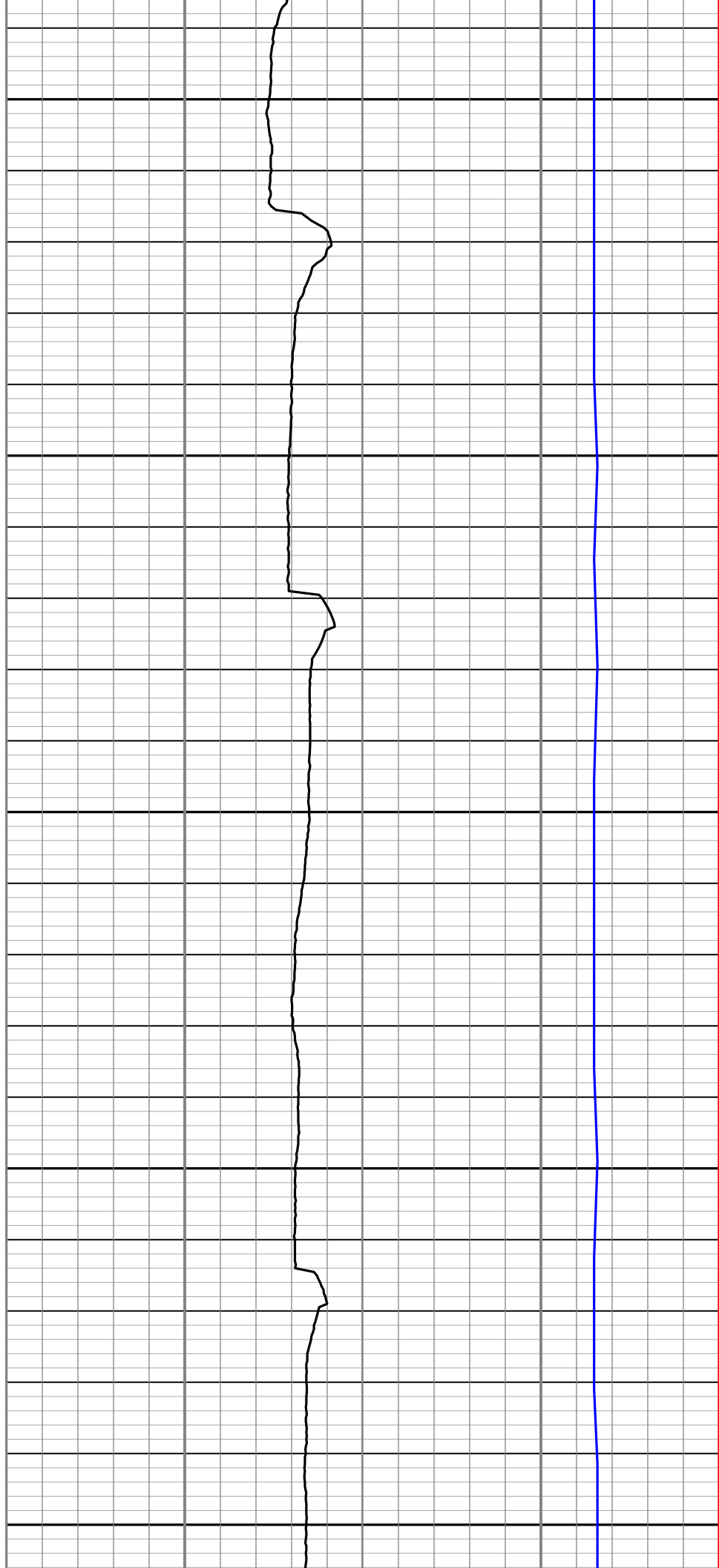
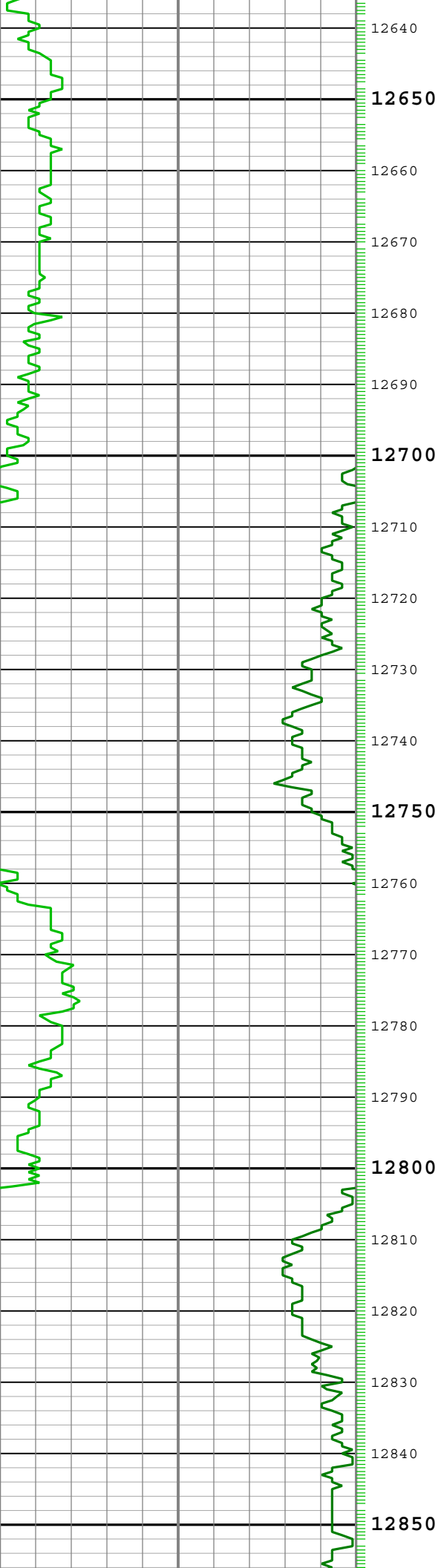


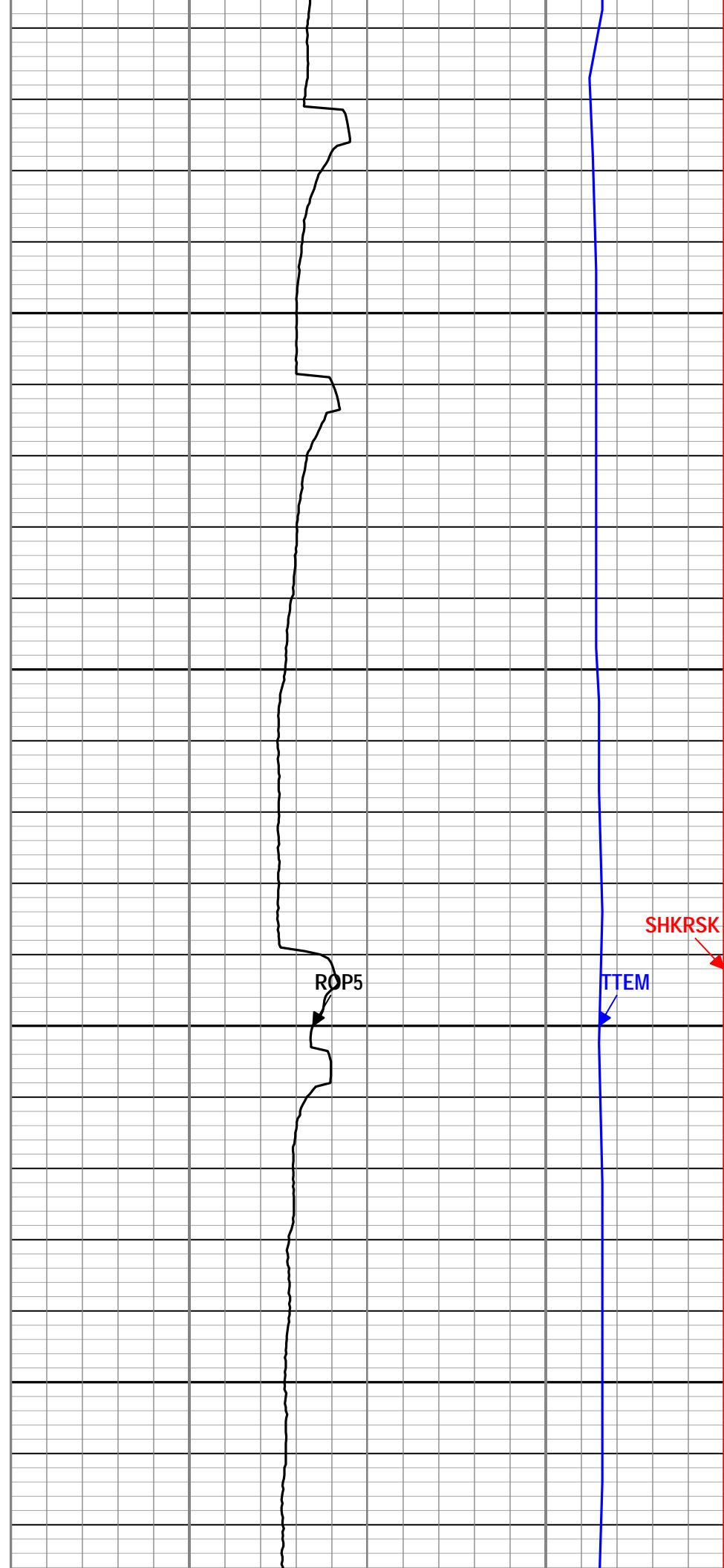
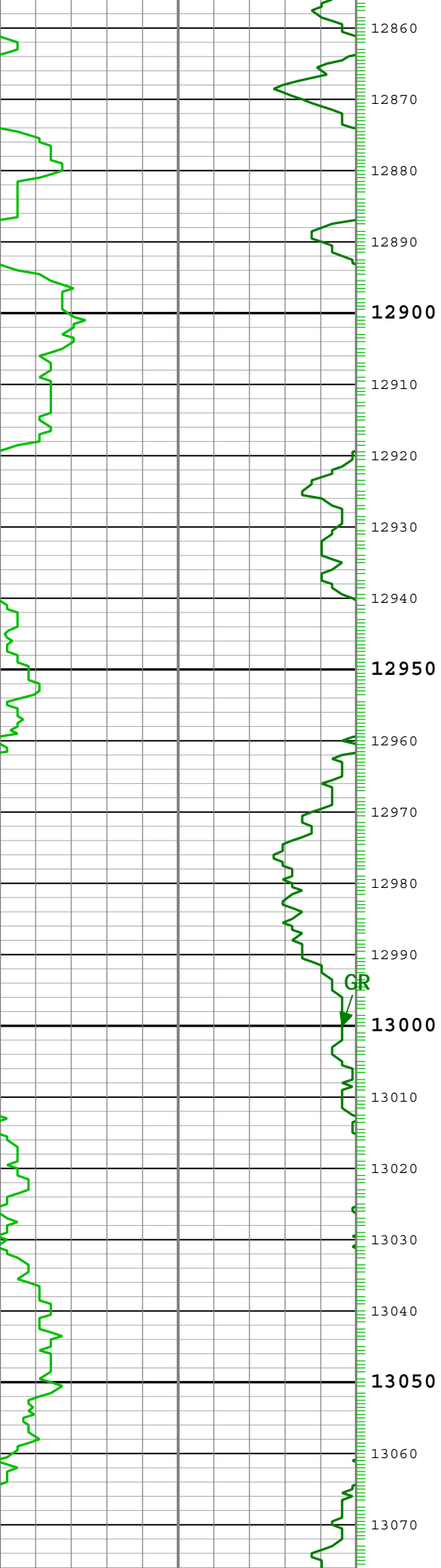


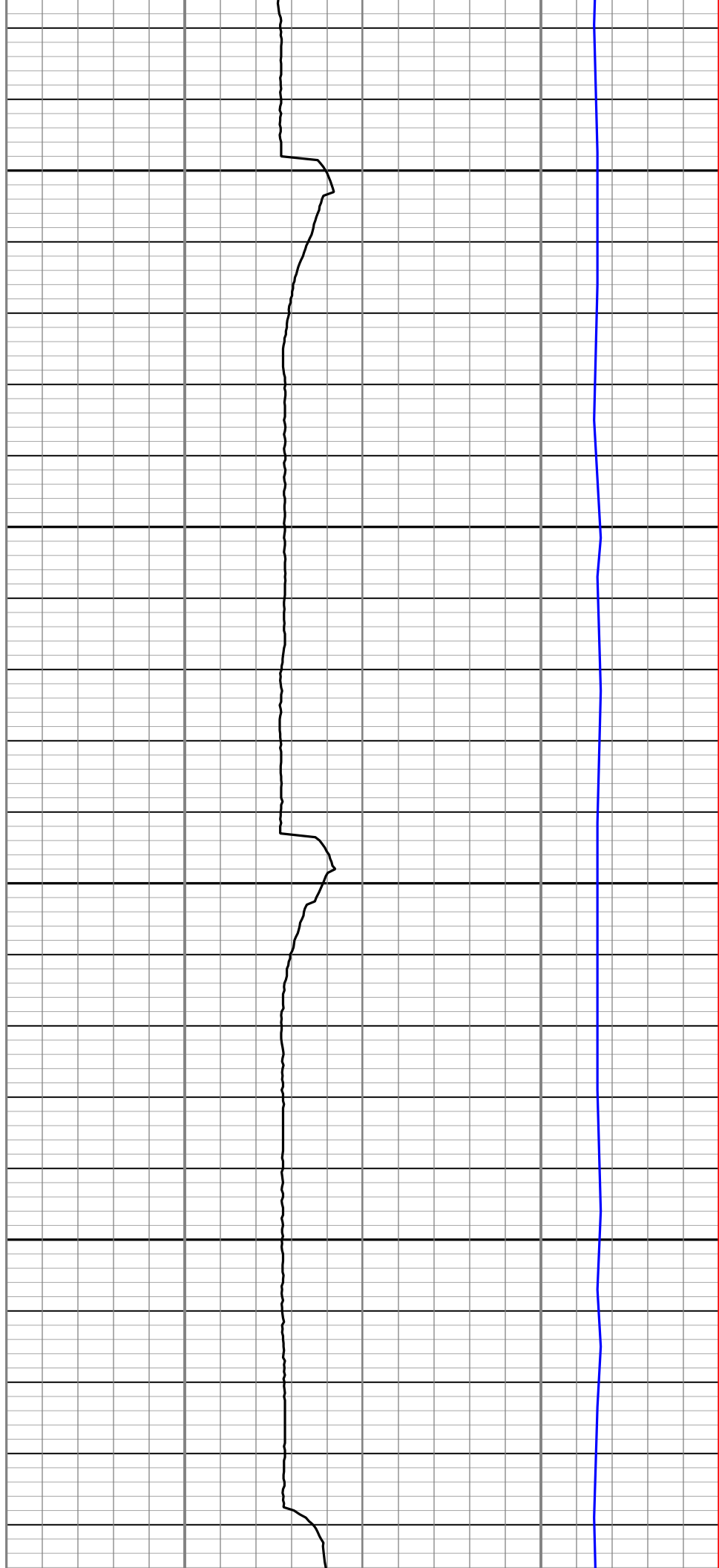
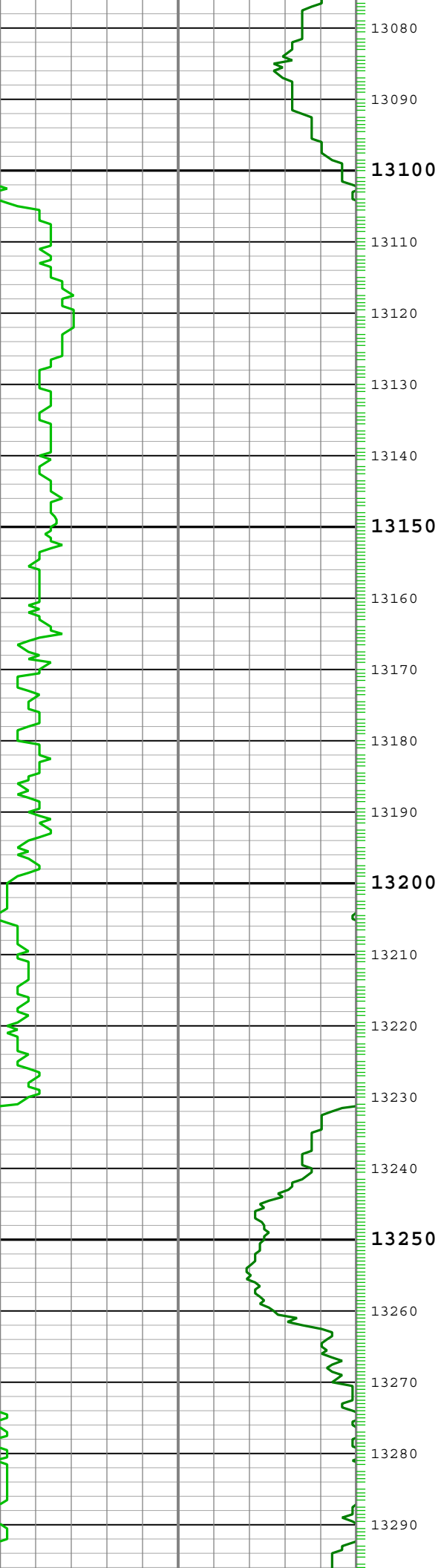


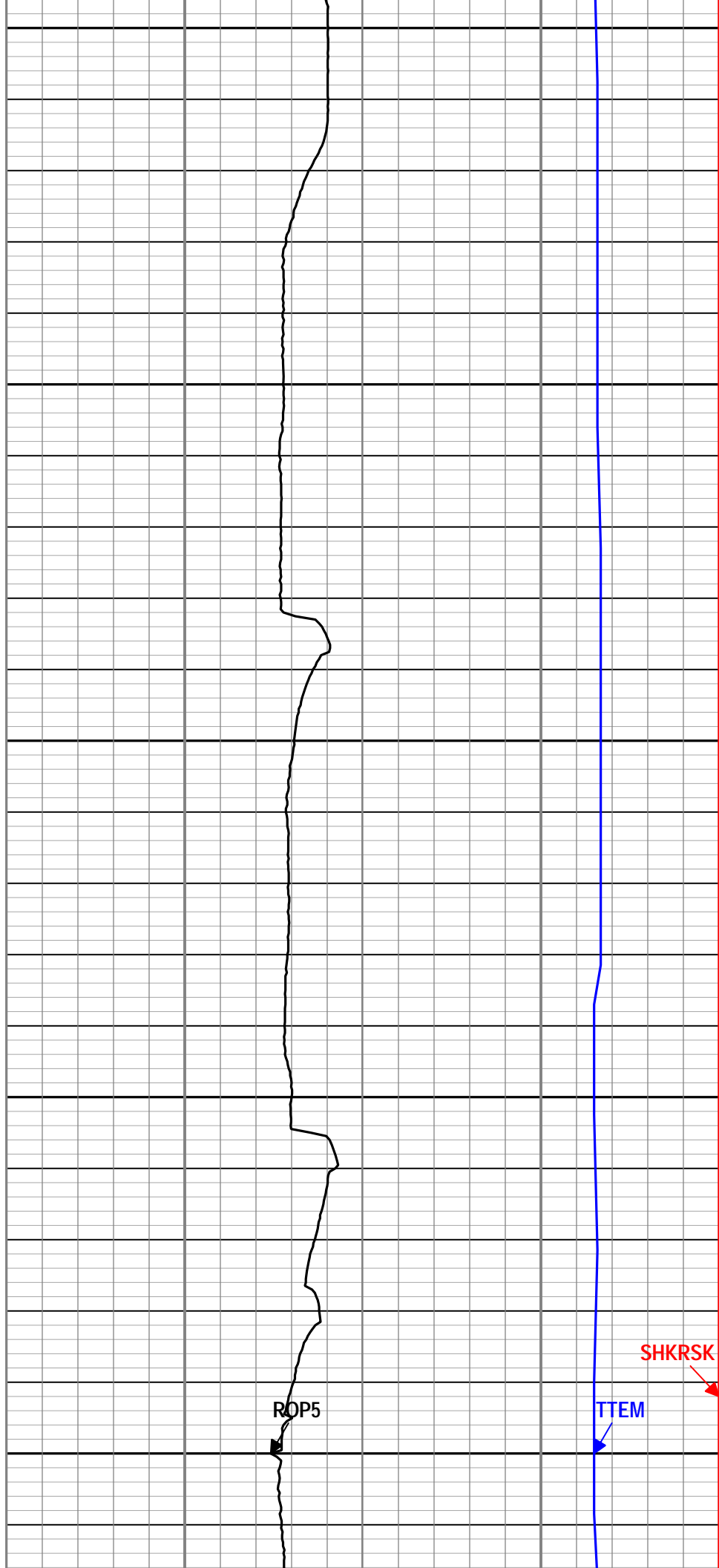
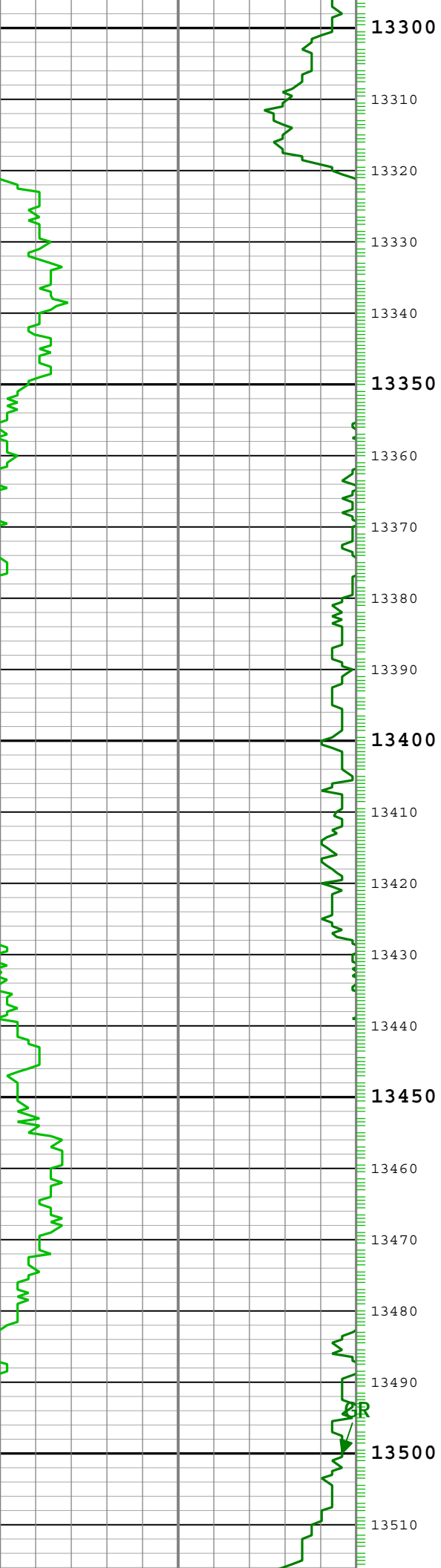


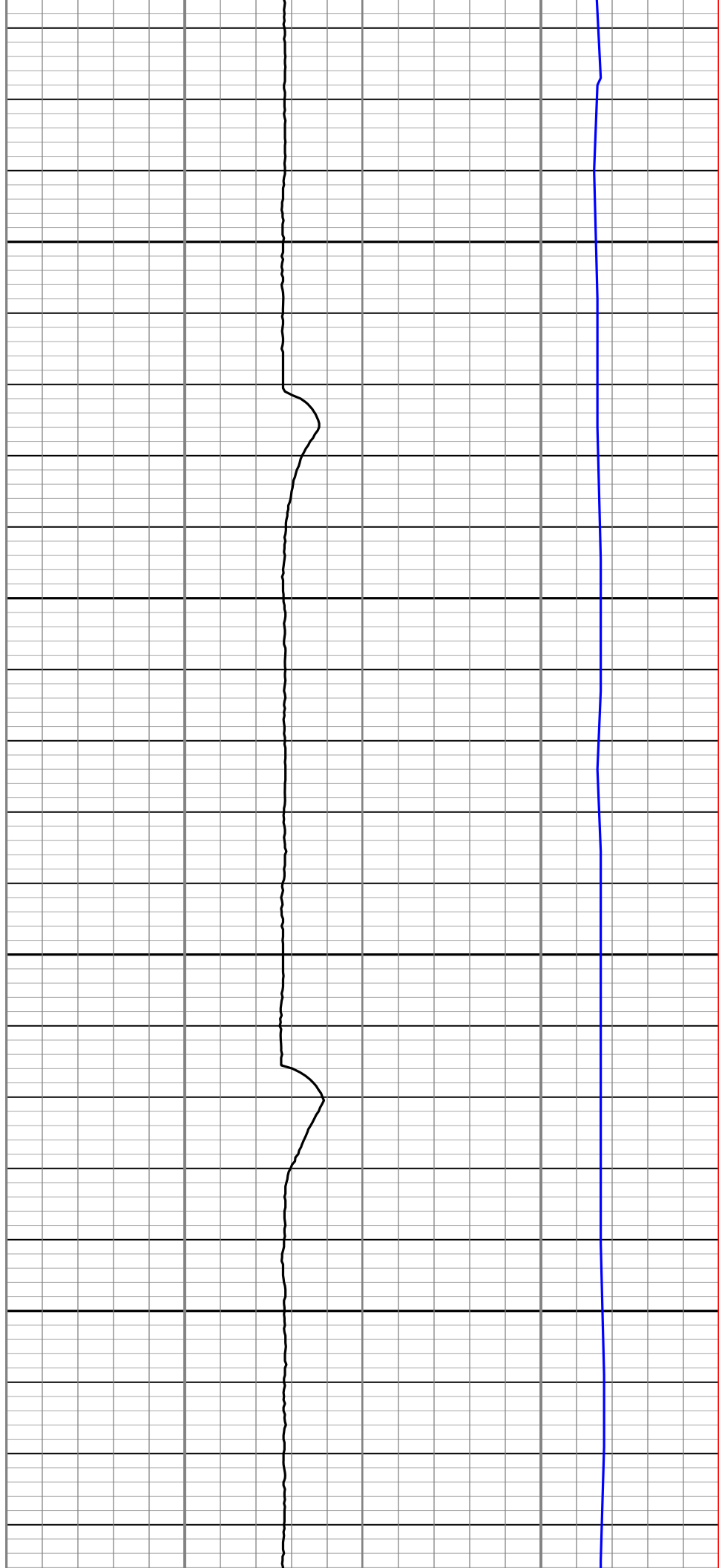
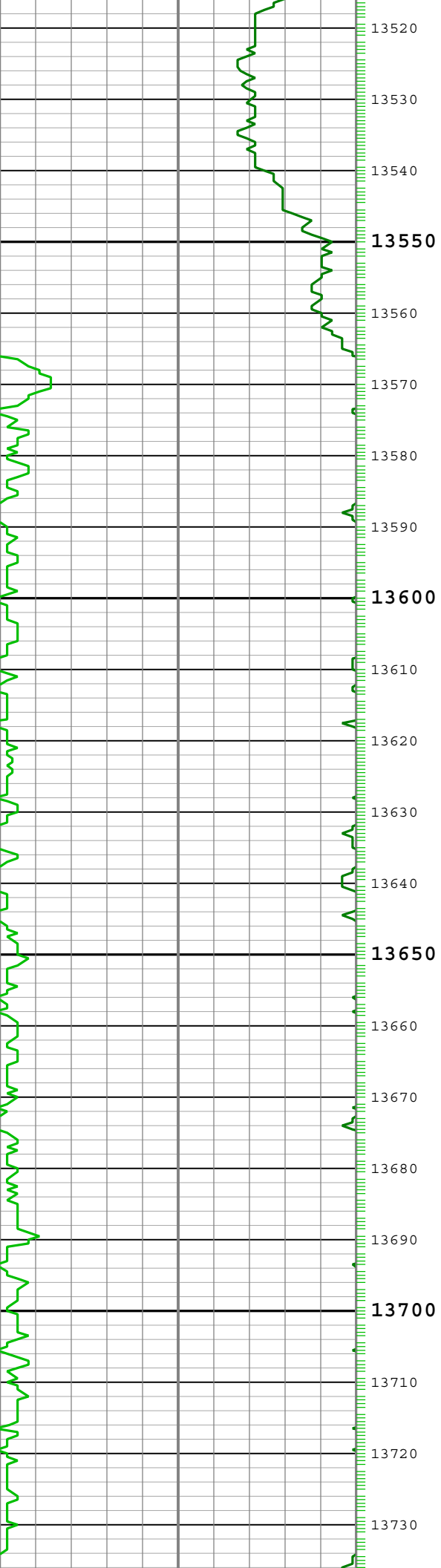


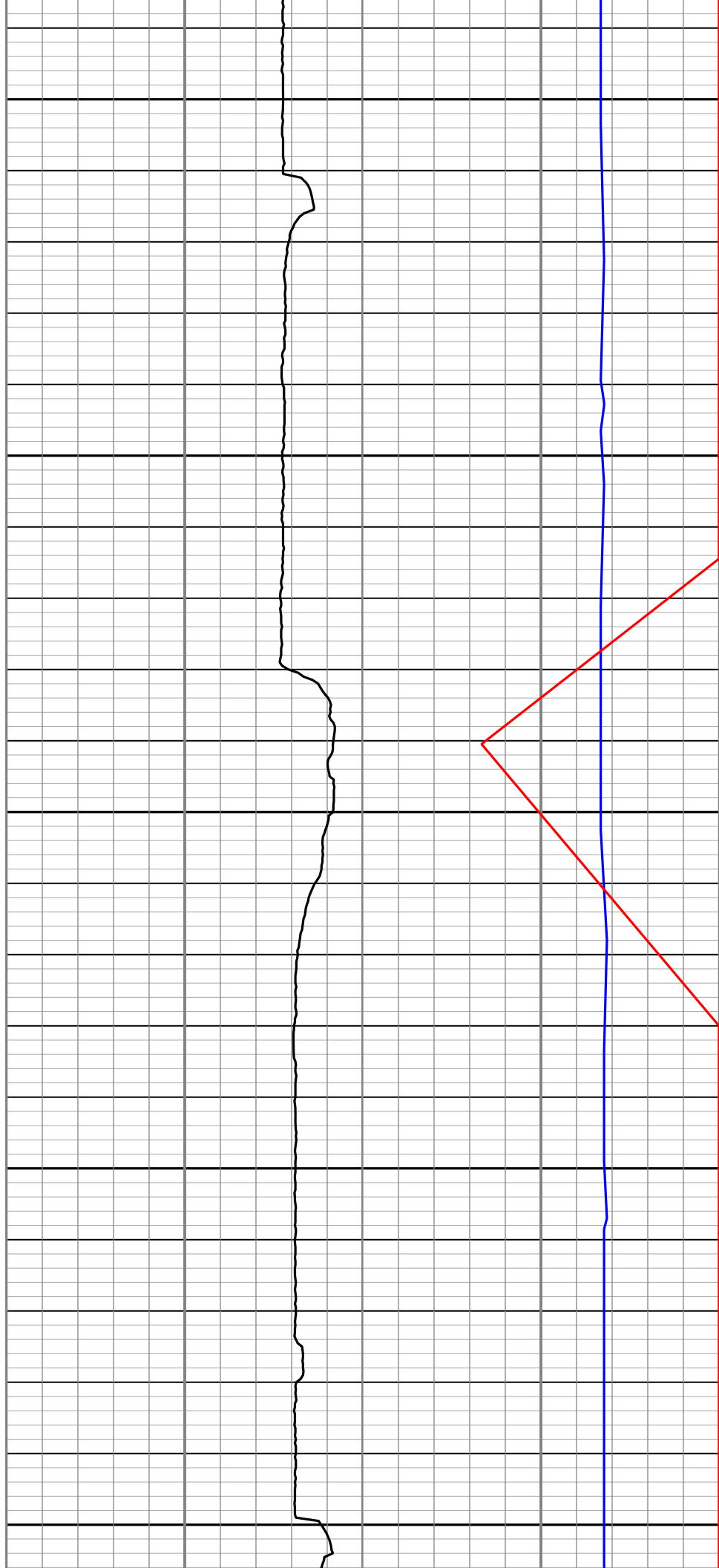
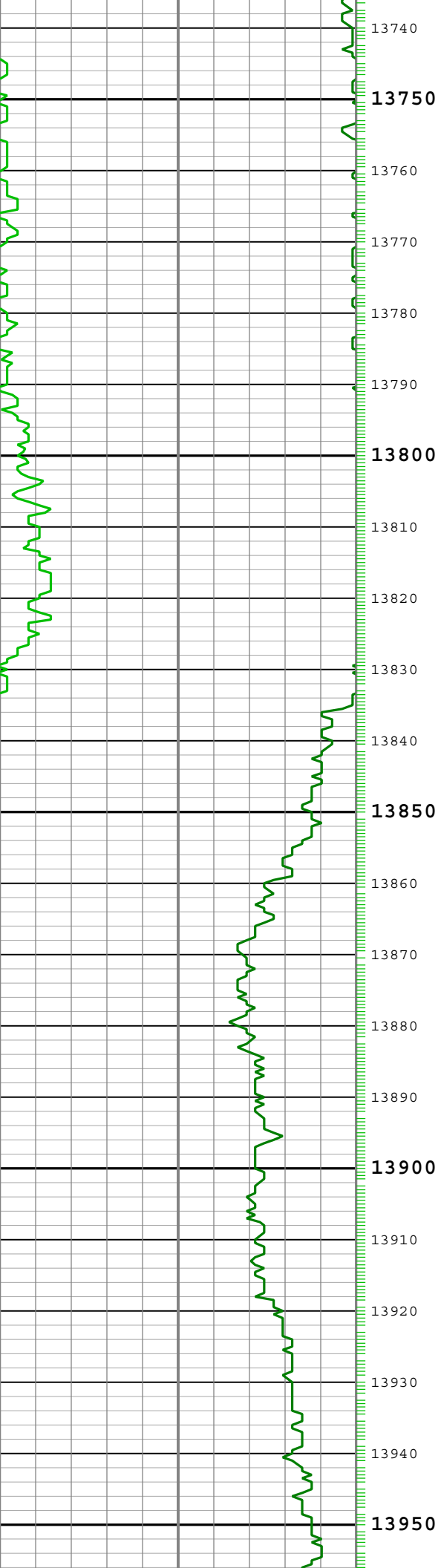


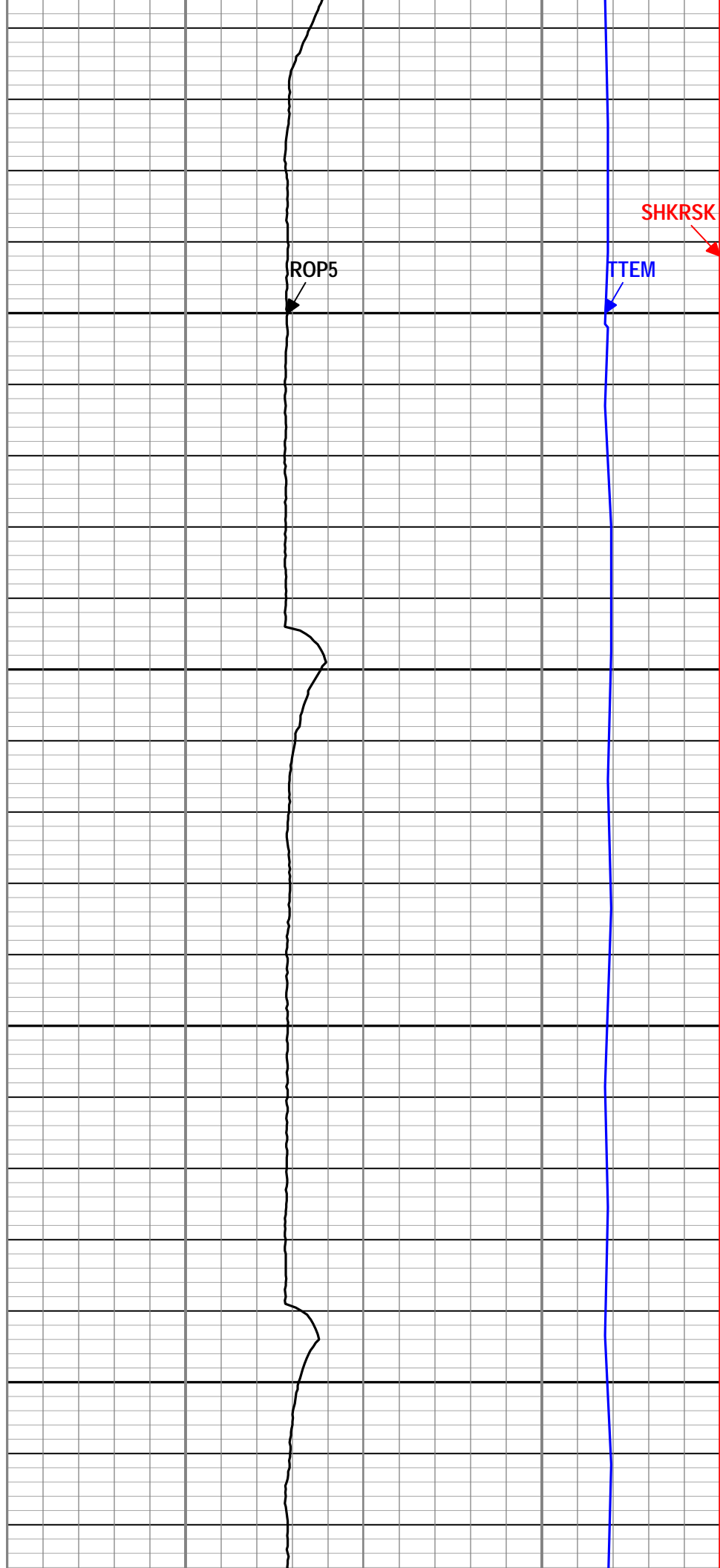
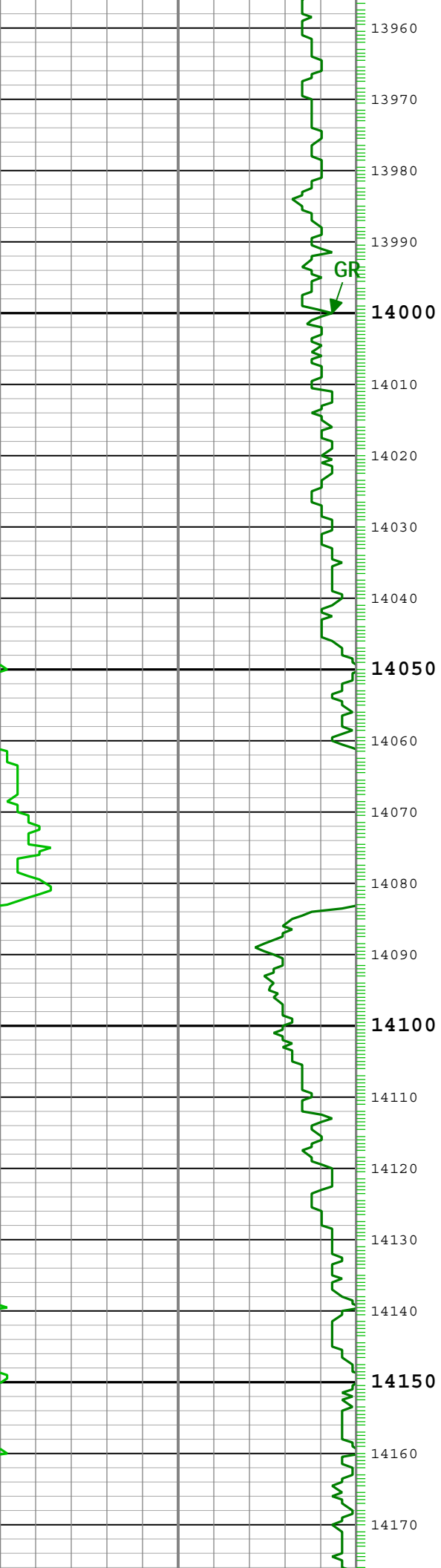


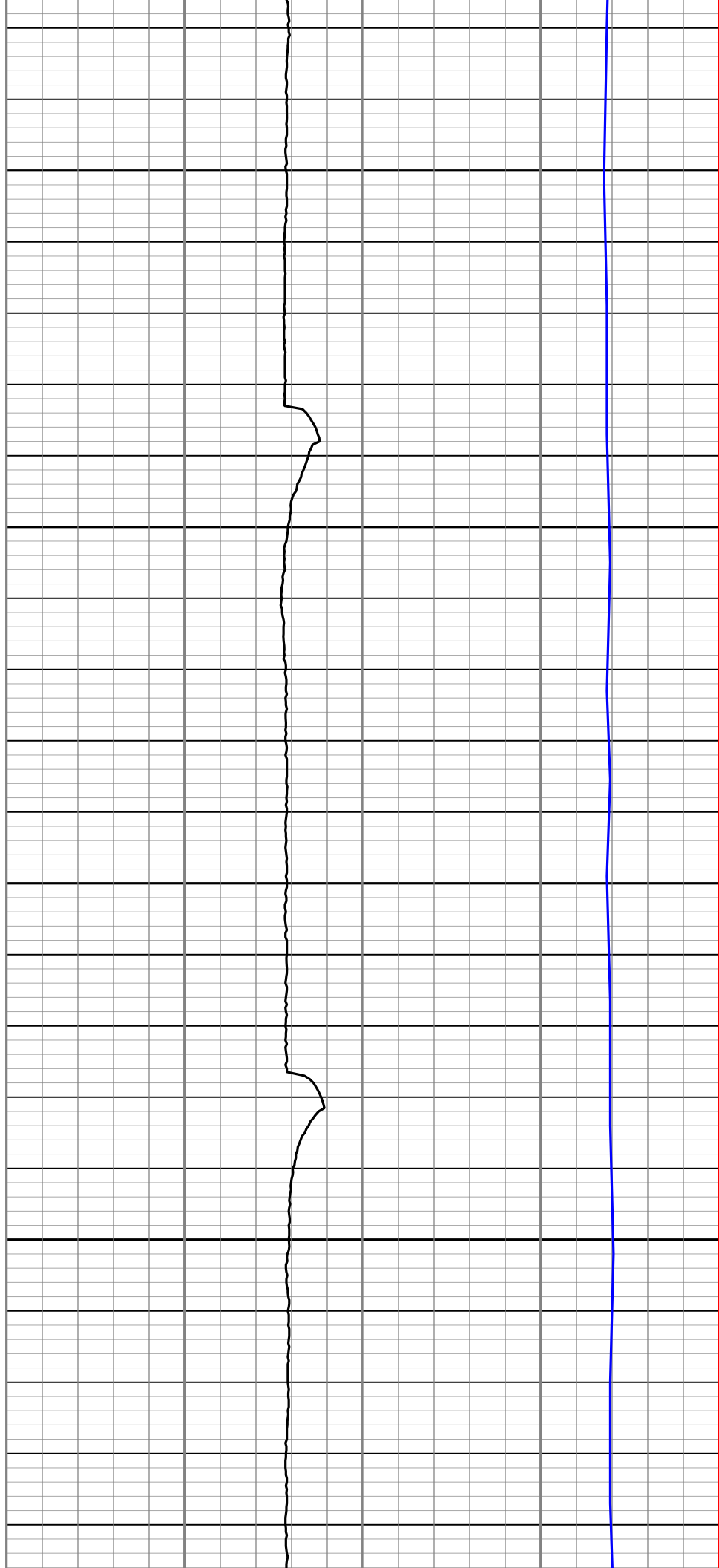
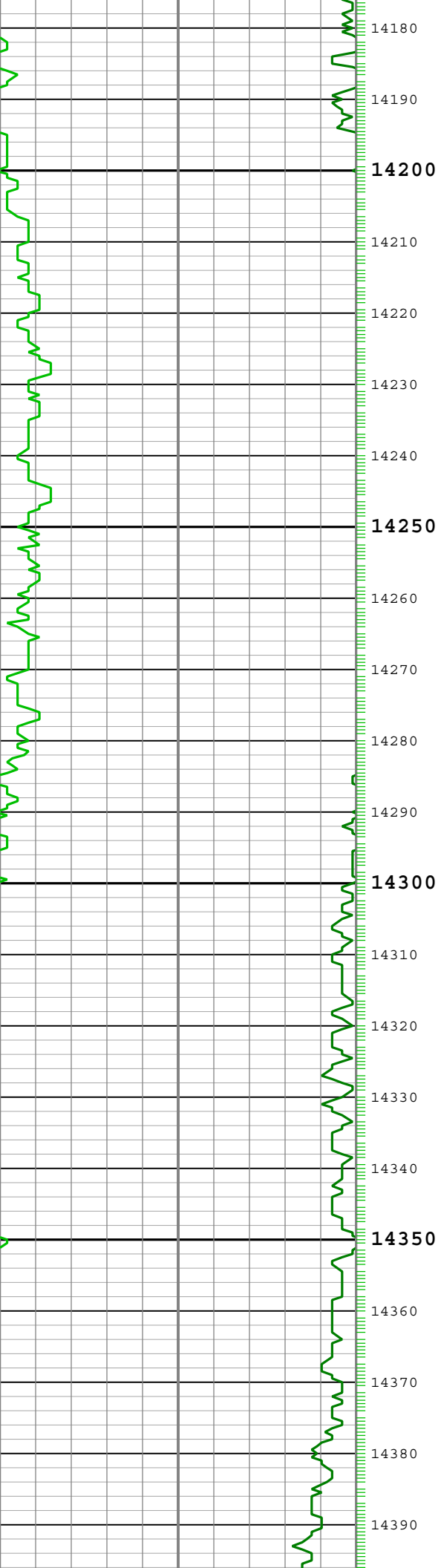




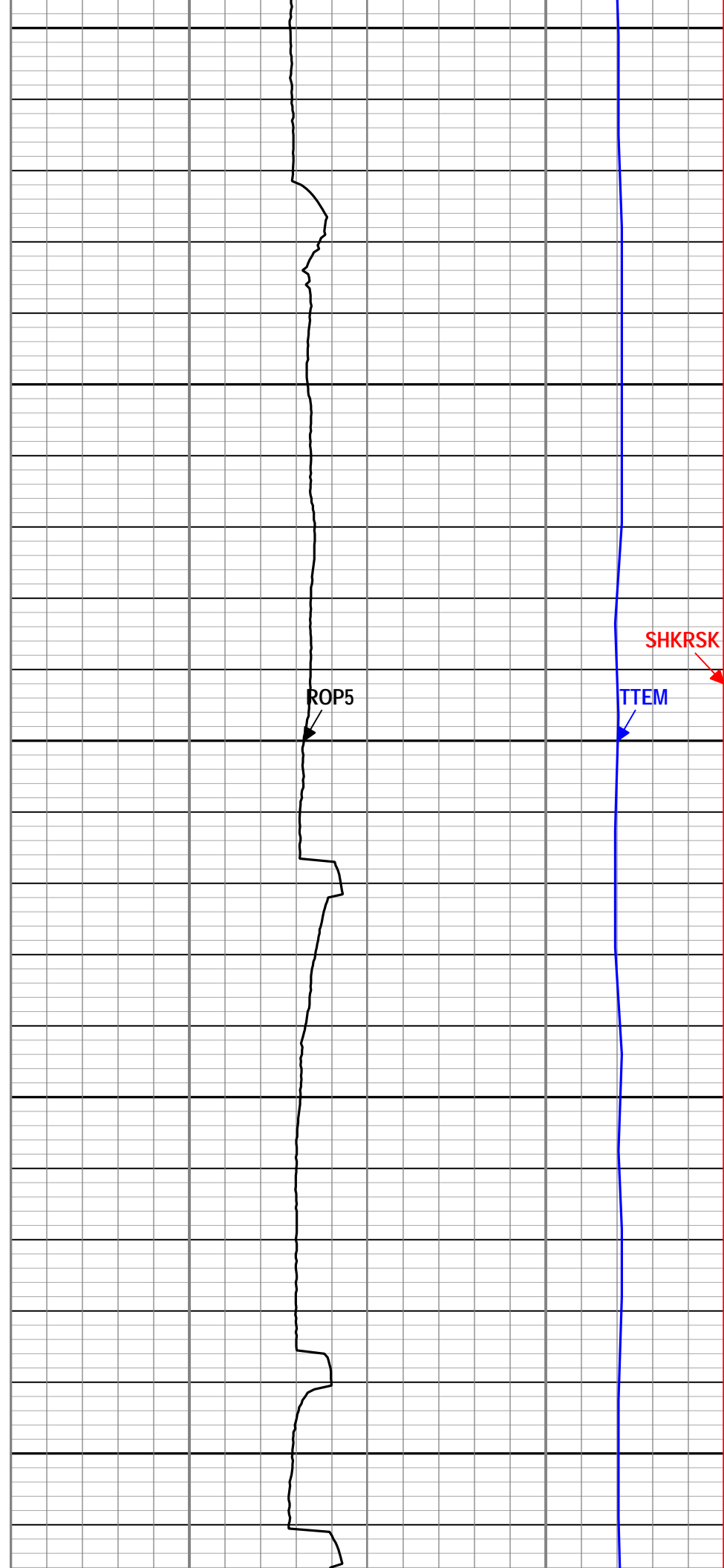
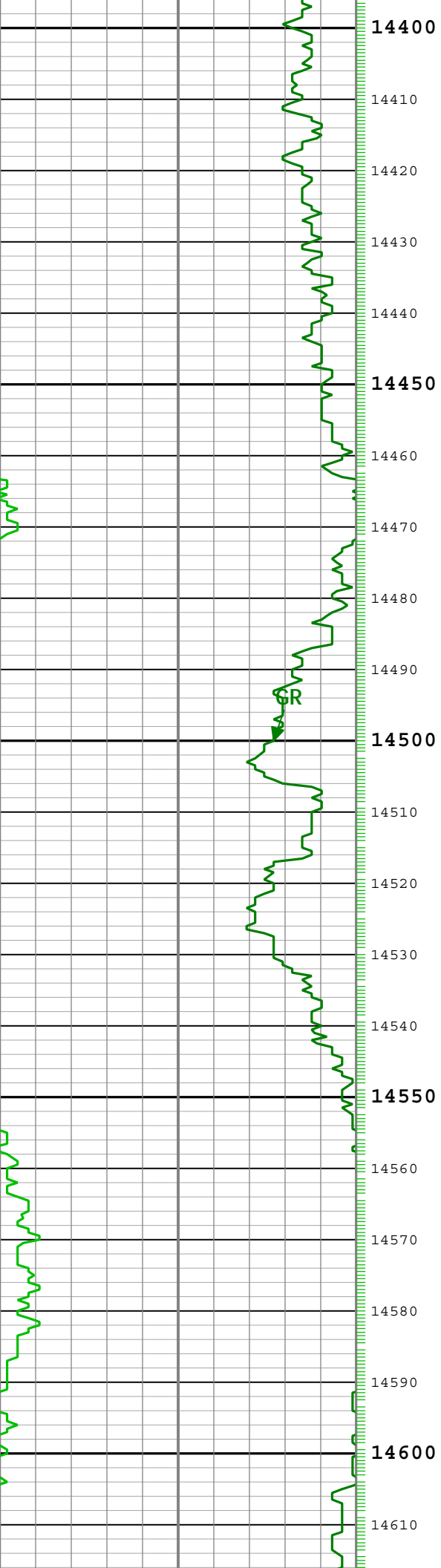


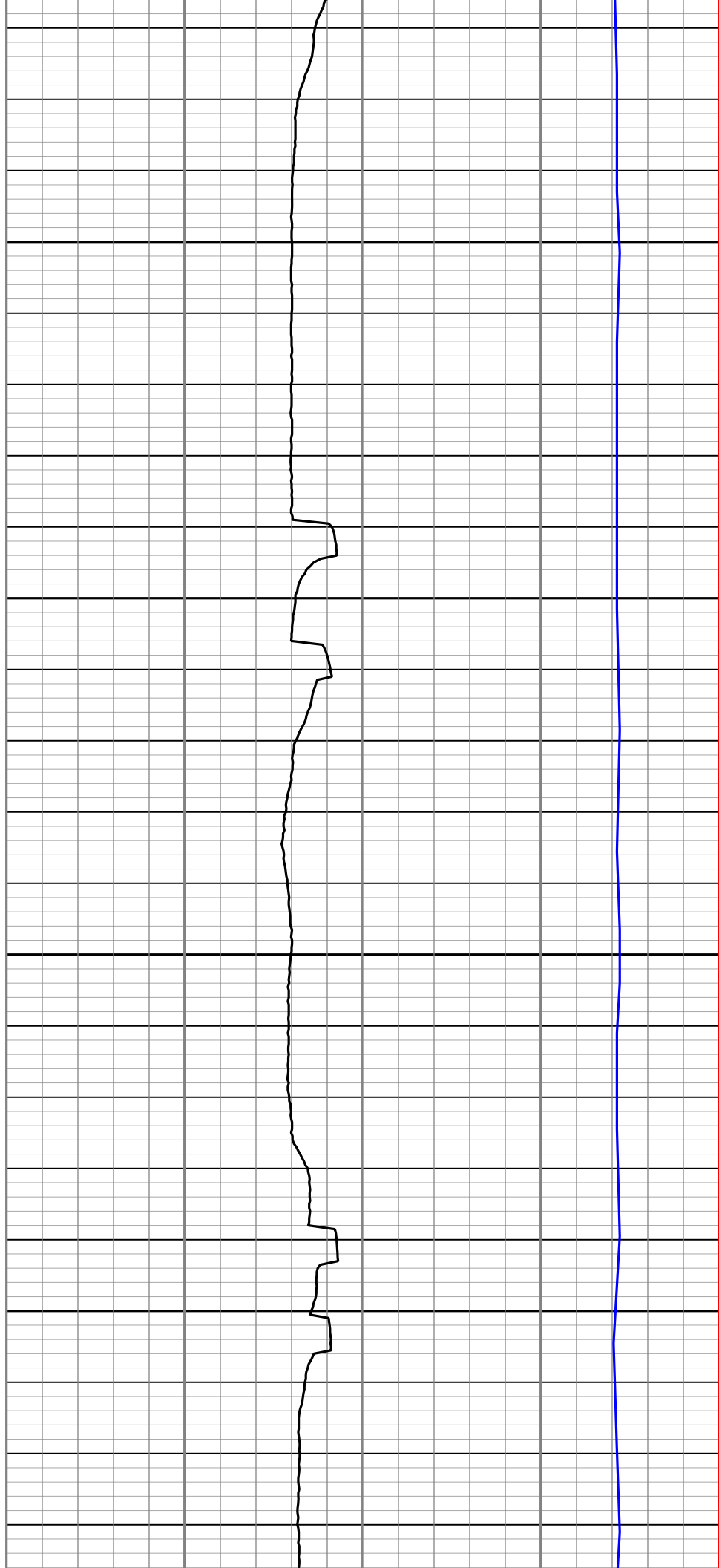
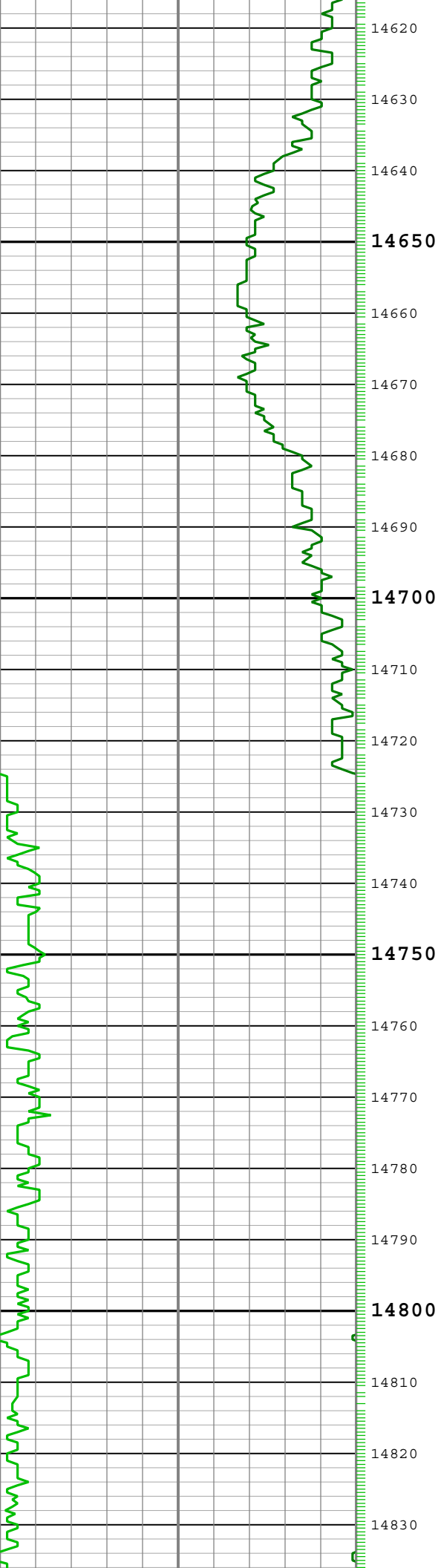


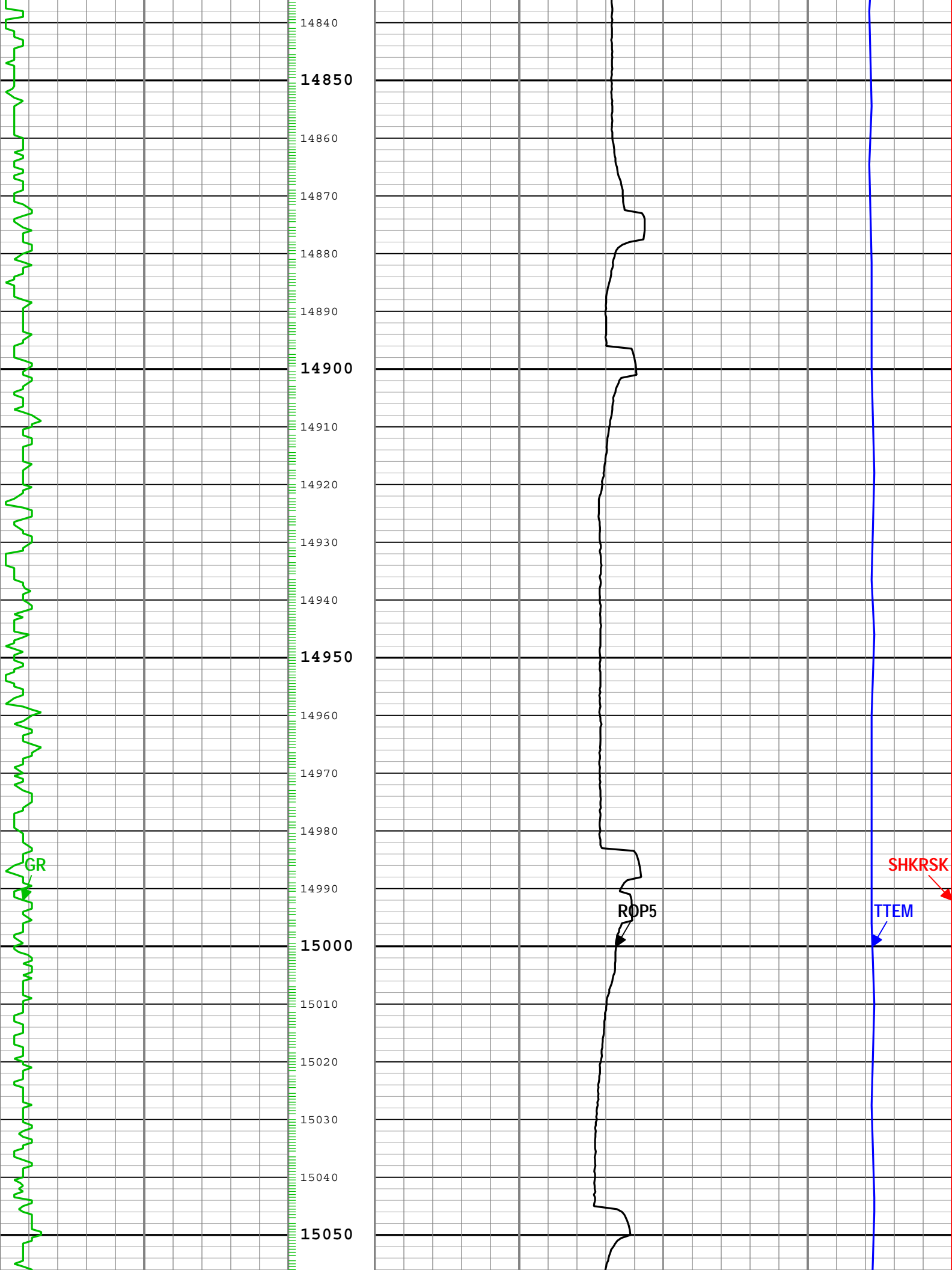


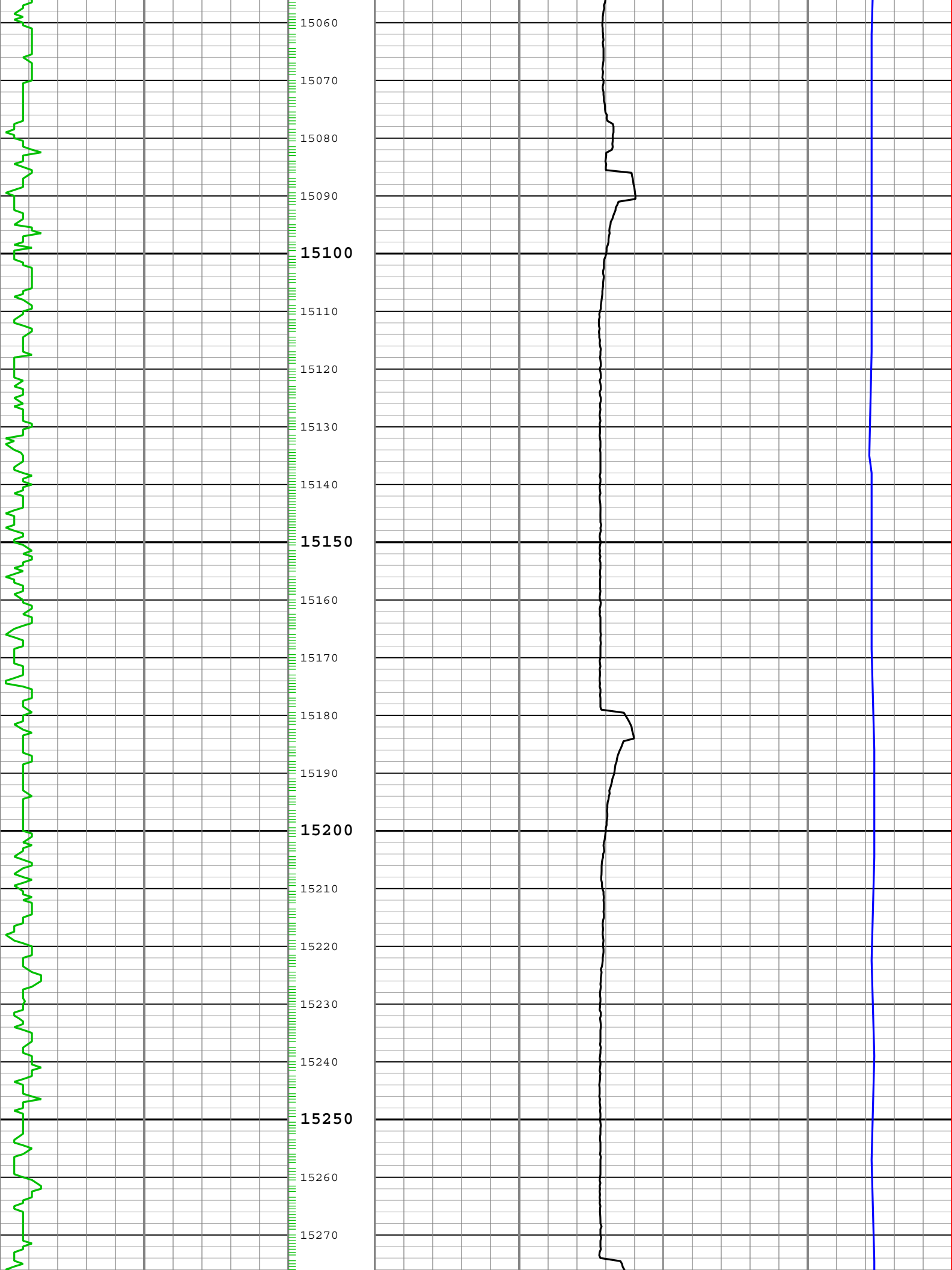


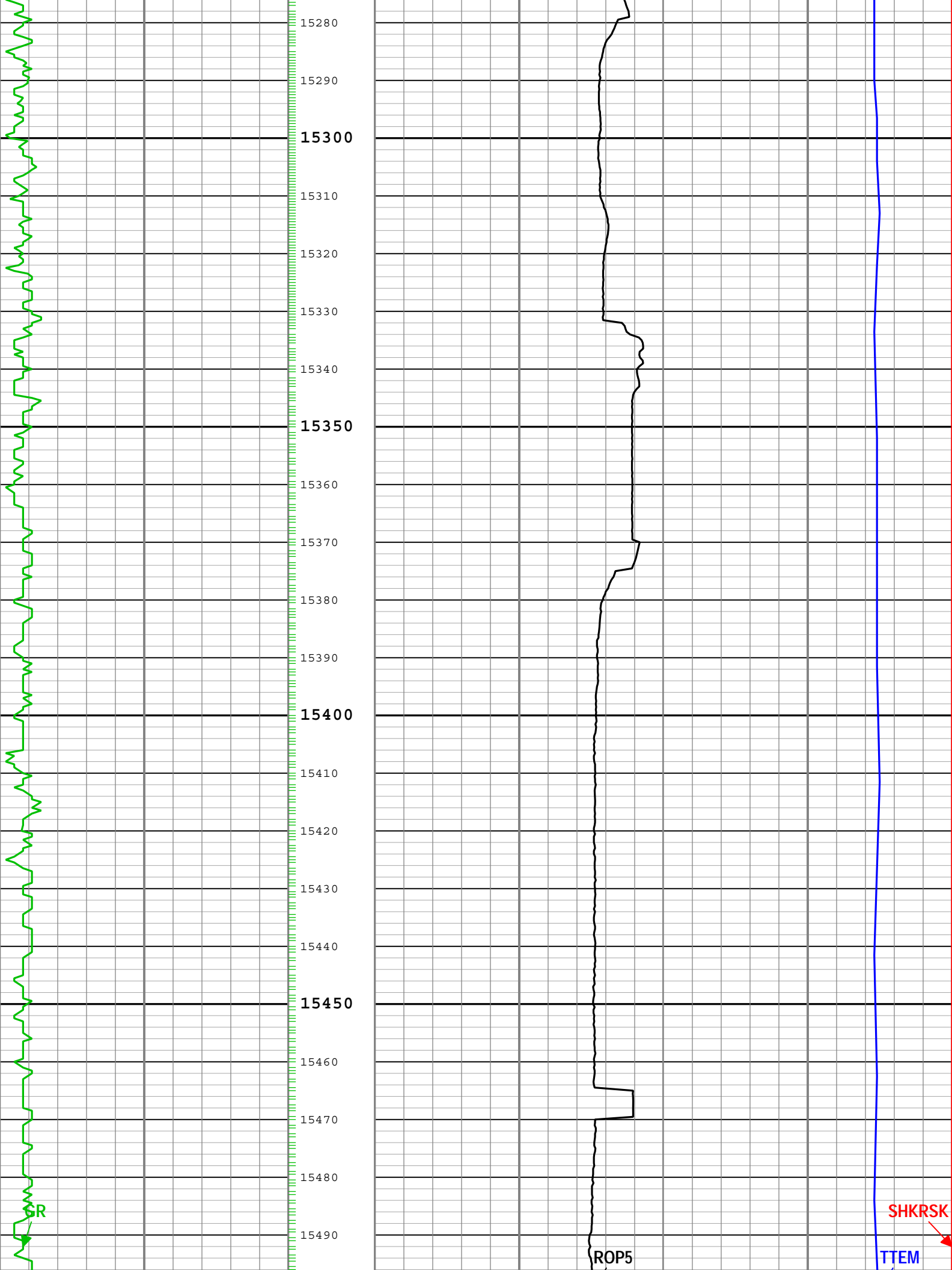


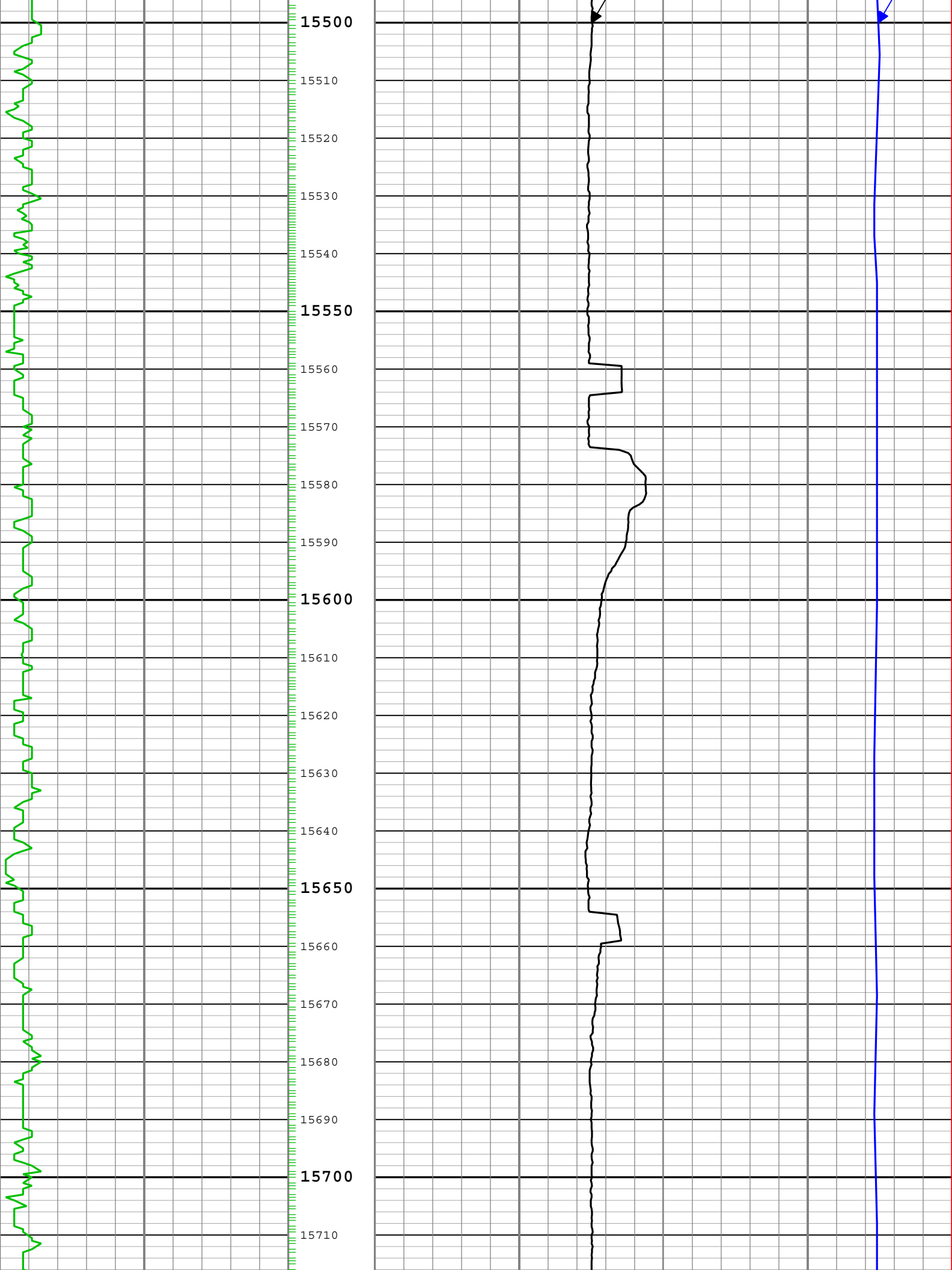


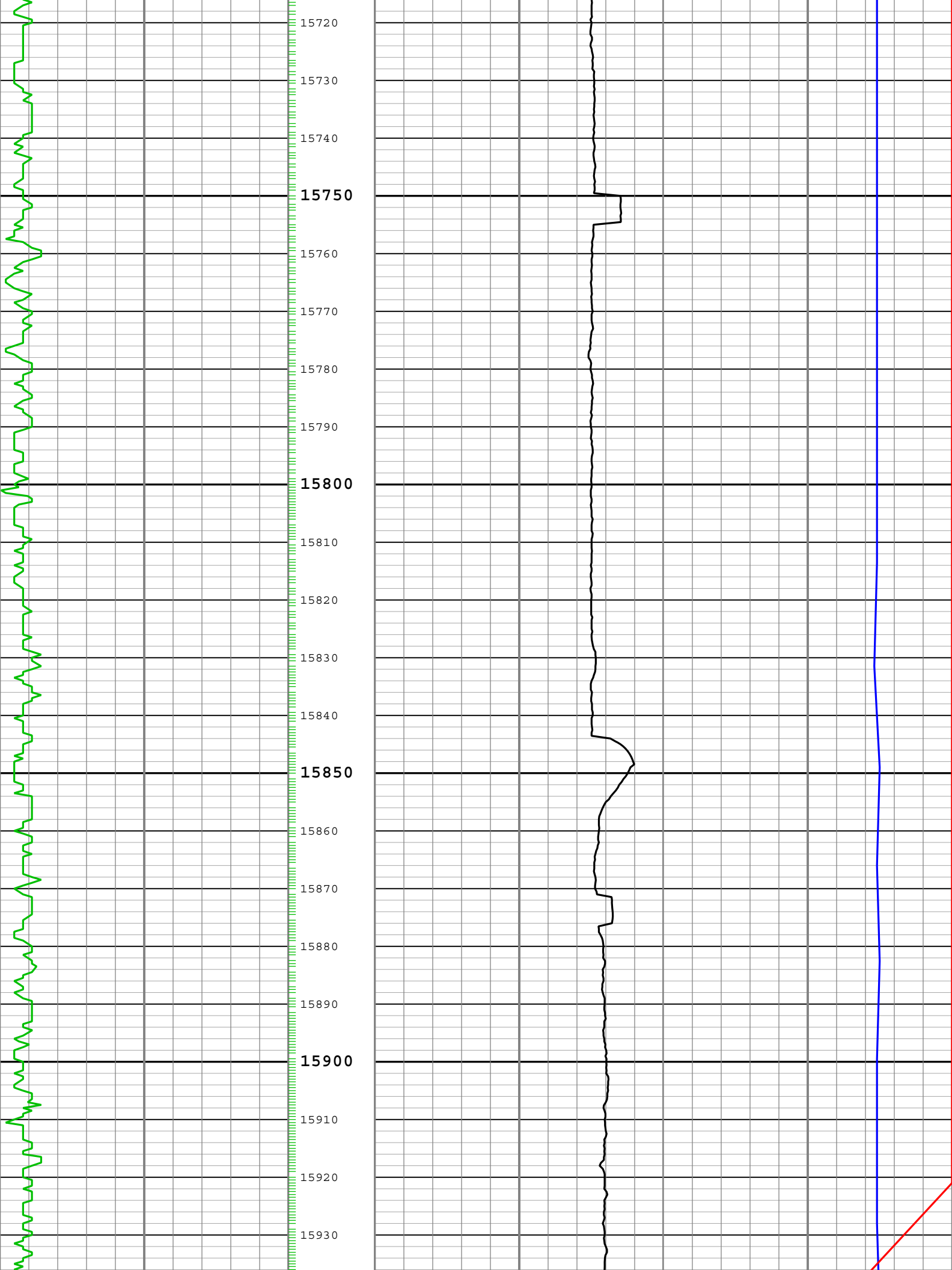


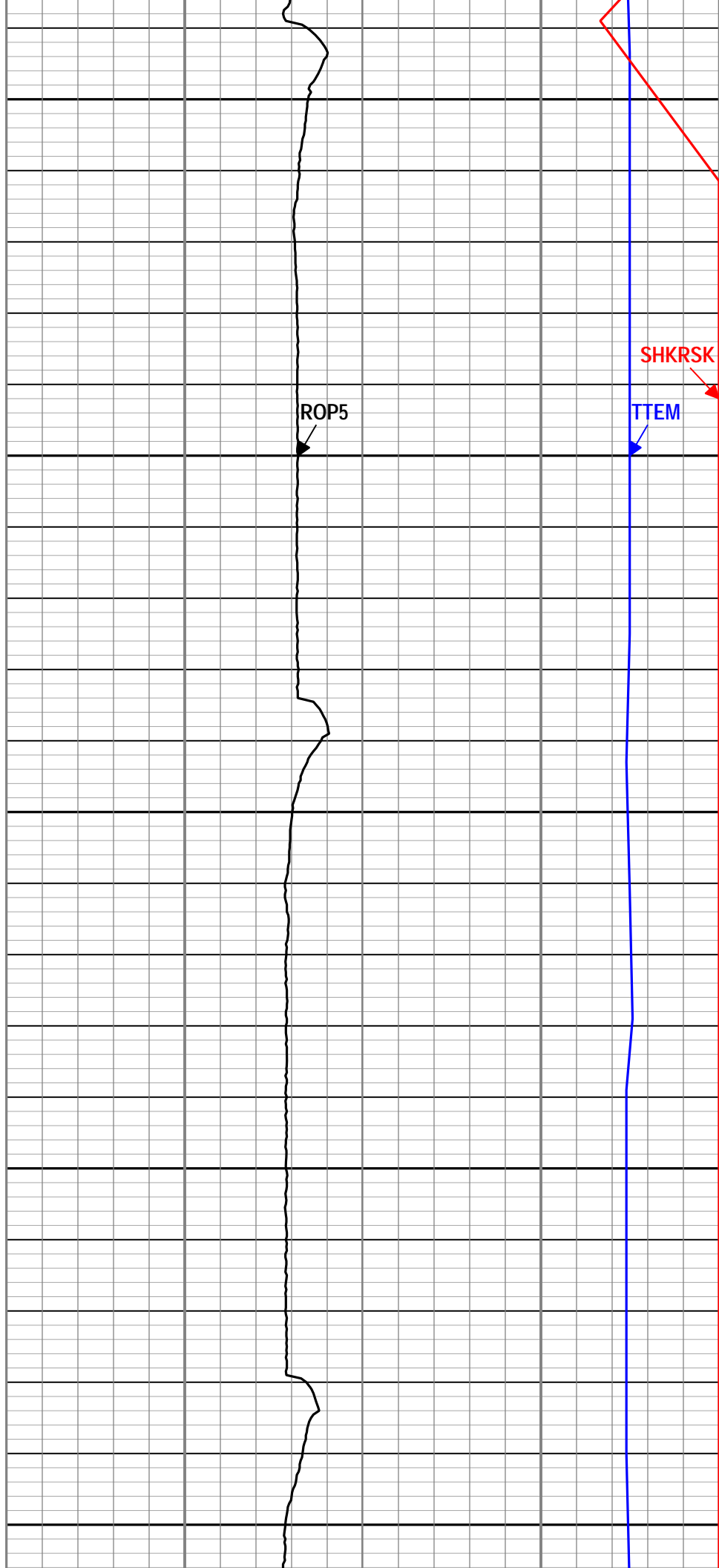
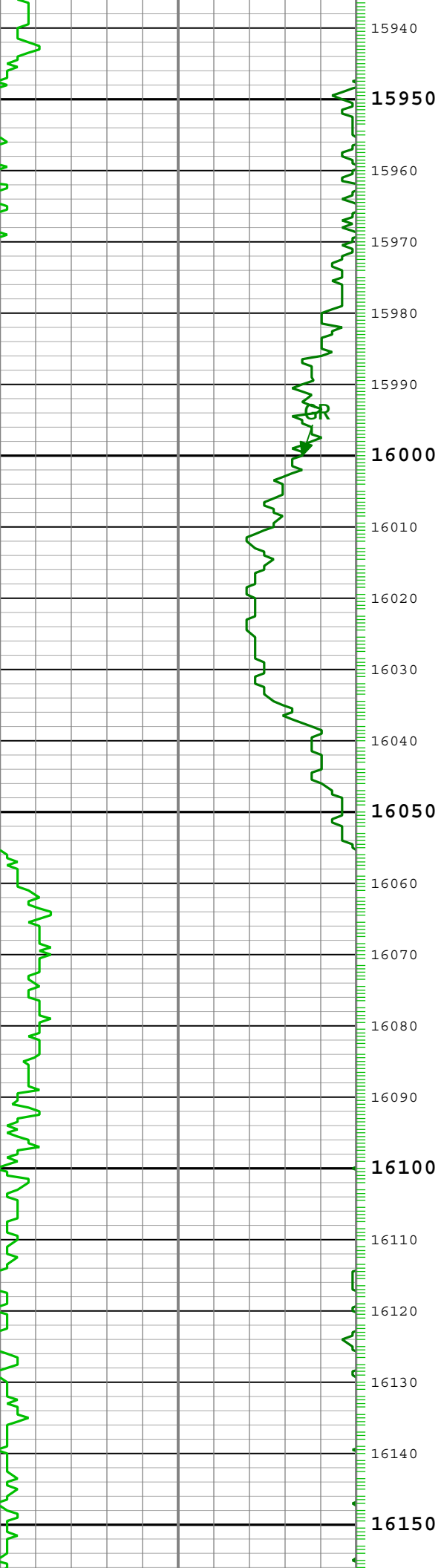




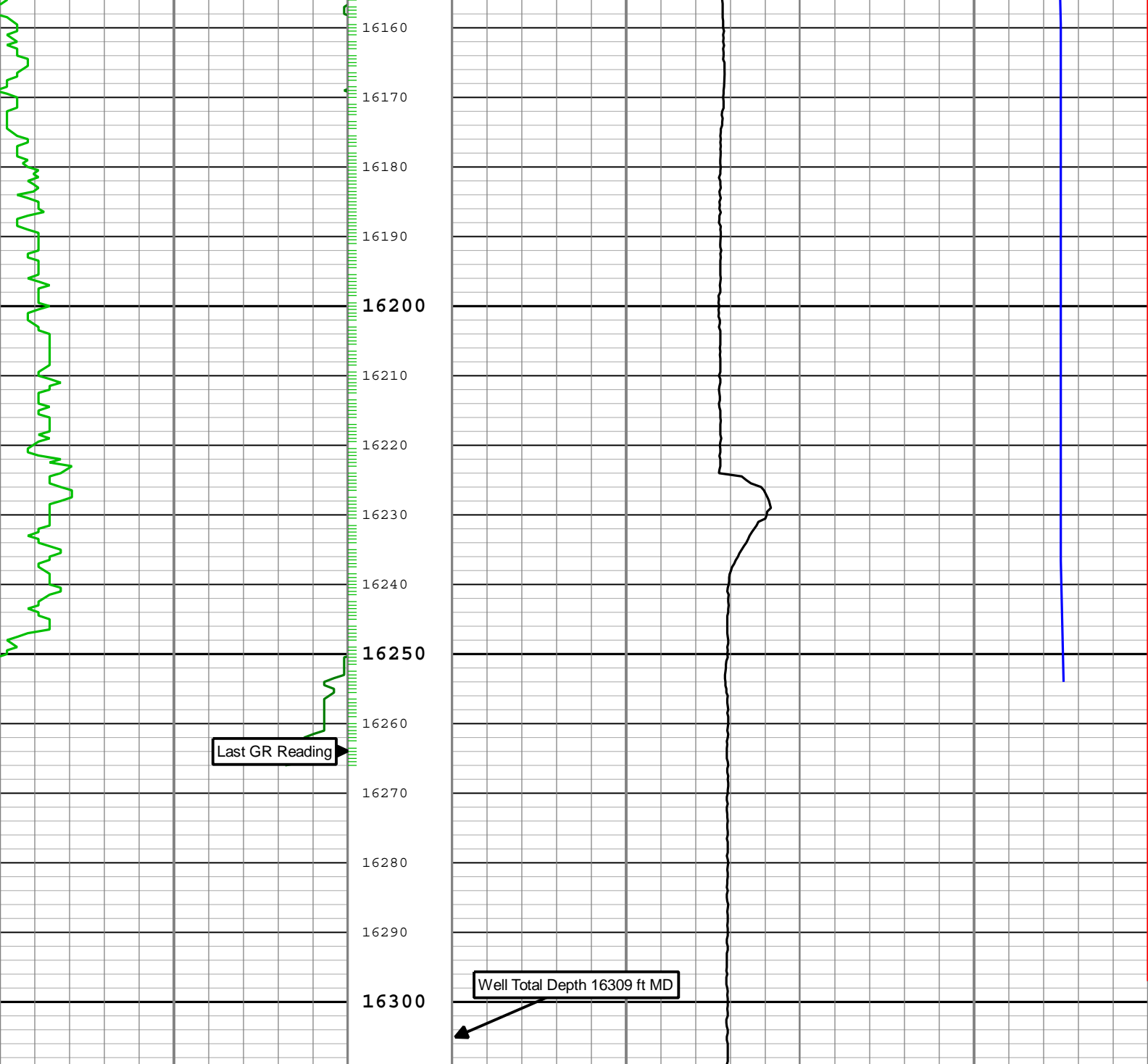












Gamma Ray (GR) SlimPulse[1] RM		
0	gAPI	150
Gamma Ray (GR) SlimPulse[1] RM		
150	gAPI	300
Gamma Ray (GR) SlimPulse[1] RM		
300	gAPI	450
Gamma Ray (GR) SlimPulse[1] RM		
450	gAPI	600

Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5) RT		
1000	ft/h	0

Tool Temperature (TTEM) SlimPulse[1] RM		
100	degF	300
Shock Risk (SHKRSK) SlimPulse[1] RT		
3		0

GR - Gamma Ray SlimPulse[1] RM

Description: SlimPulse Gamma Ray 1    Format: Log ( Final MD Log )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 05-Aug-2014 03:03:35

Channel Processing Parameters				
RUN001: Parameters				
Parameter	Description	Tool	Value	Unit

BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	8.8	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

RUN001Depth Zoned Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	13.5	840	840
BS	8.75	840	5993

All depth are actual.

RUN002: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	8.75	in
DFD	Drilling Fluid Density	Borehole	10	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

RUN003: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	9.8	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

RUN003Depth Zoned Parameters

Parameter	Value	Start ( ft )	Stop ( ft )
BS	8.75	6911.01	6980
BS	6.125	6980	16309

All depth are actual.

Tool Control Parameters

Calibration Report

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run RUN001

Primary Equipment :	Elec. cartridge, 150C max with GR	SPEC	6095
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GRGain - Gamma Ray: Blanket

Master (Time Frame File):		12:00:00 23-May-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>	
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0736	1.1000	<div><div></div><div></div><div></div><div></div></div>	

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run RUN002

Primary Equipment :	Elec. cartridge, 150C max with GR	SPEC	896
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GRGain - Gamma Ray: Blanket

Master (Time Frame File):		12:00:00 25-Jul-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0309	1.1000	<div><div></div><div></div><div></div><div></div></div>

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run RUN003

Primary Equipment :	Elec. cartridge, 150C max with GR	SPEC	6095
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GRGain - Gamma Ray: Blanket

Master (Time Frame File):		12:00:00 23-May-2014						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Gamma Ray Calibration Gain		Master	1 0000	0 9000	1 0736	1 1000		

Company:	Noble Energy INC
Well:	NCLP AA06-64-1AHNA
Field:	Wattenberg #90750
County:	Weld #123
State:	Colorado
Country:	USA



SlimPulse - Gamma Ray

2 in. / 100 ft and 5 in. / 100 ft Measured Depth

Recorded Mode, Composite Log